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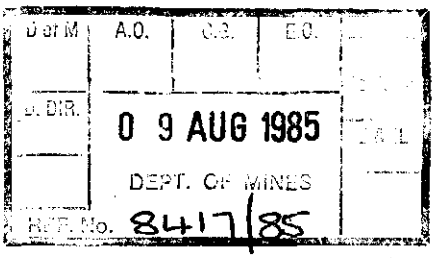
PROJECT A-84-109

AMOCO MINERALS AUSTRALIA COMPANY



PROGRESS REPORT

JULY 1984 TO JUNE 1985

AMOCO/CSR JOINT VENTURE

PART EXPLORATION LICENCE 15/76

DUNDAS, TASMANIA

GL KARY

JUNE 1985

REPORT 450

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Project Location

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SUMMARY AND CONCLUSIONS

Exploration Licence 15/76 was granted to CSR for a period of six months from August 1976 with further twelve-month renewals subject to Mines Department approval until its expiry date in August 1987. Amoco negotiated a joint venture with CSR to farm into a 58 square kilometer portion of EL 15/76 embracing the prospective Gordon Limestone sequence to the east of Amoco's adjoining EL 4/78. EL 15/76 was reduced from 145 square kilometers to 125 square kilometers in August 1984.

The primary exploration target for the area is a large tonnage Irish-style carbonate hosted lead-zinc-silver orebody, however, the area covers sequences with potential for either shale or carbonate hosted basemetal prospects.

Work during the period included the following:

A total of 2162 meters of diamond drilling was conducted on the Black Jacks, Mariposa and Bannockburn grids. Results of the drilling were generally disappointing with the best mineralization intersected near the old Mariposa Mine. Best results are -

DTM-84-2	7 meters of 4.5% lead, 1.2% zinc, 86.3g/t silver
DTM-84-6	8 meters of 3.0% lead, 0.4% zinc, 44.8g/t silver
DTM-84-9	9 meters of 6.4% lead, 0.85% zinc, 53.2g/t silver

Downhole gamma and PEM surveys were completed on most drillholes. The gamma results are inconclusive and the PEM defined only one significant response which indicates a small, weak conductor under hole DTM-84-9.

Wacker bedrock sampling was completed on several lines at the Bannockburn, Sunny Corner, Mariposa and Black Jacks prospects. The sampling has defined a large zone of anomalous bedrock geochemistry at Sunny Corner, however the recent diamond drilling program failed to intersect significant mineralization in the same area.

Lead isotope and geochemical studies of surface and drillhole mineralization were completed by consultants.

An initial program of costean rehabilitation was completed.

Only one-third of the prospective Gordon Limestone in the joint venture area has been actively explored to date. Future exploration programs should be directed towards the remaining two-thirds which occur in a large basin in the southern half of the joint venture area. Recent work by EZ on the adjacent EL

4/78 has shown this basin to be very prospective. It should be noted that all exploration on the joint venture area is to be completed by August 2, 1987 as EL 15/76 is due to expire on that date.

INTRODUCTION

This report details work conducted under a joint venture between CSR Pty Limited and Amoco Minerals Australia Company on part EL 15/76. Amoco negotiated a joint venture with CSR to farm-in to a 58 square kilometer portion of EL 15/76 (Figure 1) earning a 50% interest in the property over a period of three years.

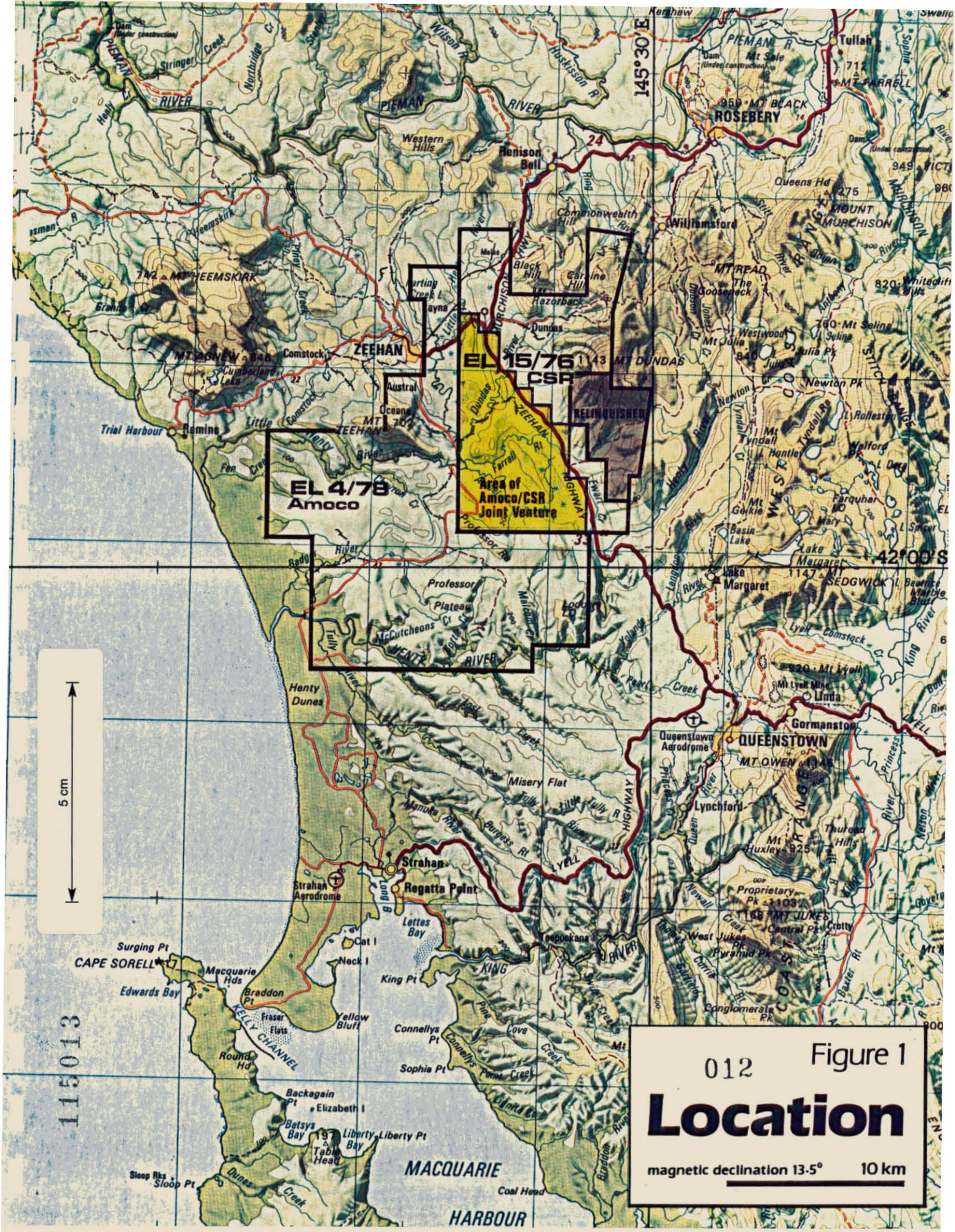
Details of all work conducted prior to January 1985 were submitted previously by CSR in their October 1981 to February 1982, January to June 1982, July to December 1982, January to June 1983, July to December 1983 and January to July 1984 six monthly reports to the Mines Department.

The joint venture area is considered to have excellent potential for a Irish style carbonate hosted lead-silver deposit or a shale hosted lead-zinc deposit.

LOCATION AND ACCESS

Exploration Licence 15/76 abuts Amoco's tenement EL 4/78 (Figure 1) three kilometers east of the town of Zeehan (population approximately 5000). The Emu Bay Railway and a sealed road connect Zeehan with the port of Burnie located 140 kilometers to the north. Access within the tenement is relatively good for Western Tasmania as a number of logging tracks and a sealed highway traverse the prospective dolomite-limestone horizons which form topographic lows. Bombadier access is necessary on some grids to conduct the exploration programs.

Zeehan is the service town for the Renison tin mine and no difficulties would be anticipated with respect to power, water, labor and transport should a mine be developed. The area has an annual rainfall of 250 centimeters.


EL 15/76
CSR
RELINQUISHED
Area of
Amoco/CSR
Joint Venture
EL 4/78
Amoco
ZEEHAN
ROSEBERY
Williamsford
Queenstown
QUEENSTOWN
Strahan
Regatta Point
Trial Harbour
Remine
Henty Dunes
Macquarie Hds
CAPE SORELL
Edwards Bay
Surging Pt
Cat I
Neck I
Lettes Bay
King Pt
Sophia Pt
Connellys Pt
Yellow Bluff
Fraser Flats
Round Hd
Backagain Pt
Elizabeth I
Betsys Bay
Liberty Bay
Liberty Pt
Table Head
Sloop Pt
Sloop Rks
Coal Head
MACQUARIE
HARBOUR
KELLY CHANNEL
KING
Lake Margaret
Gormanston
Linda
Lynchford
Misery Flat
Mt Owen
Mt Dundas
Mt Read
Mt Sedgwick
Mt Huxley
Mt Jukes
Mt Farrell
Mt Heemskirk
Mt Black
Mt Lyell
Mt Tyndall
Mt Julia
Mt Selina
Mt Murchison
Queenstown Aerodrome
Strahan Aerodrome
Lake Margaret
Lake Burbury
Lake Rosebery
Lake Pedder
Lake Gordon
Lake Plimsoll
Lake Mackenzie
Lake Rhona
Lake Geikie
Lake Mary
Lake Spion
Lake Fergusson
Lake Dora
Lake Rollestone
Lake Huntley
Lake Parrawe
Lake Beatrice
Lake Bluff
Lake Cumberland
Lake Comstock
Lake Basin
Lake Farquhar
Lake Newton
Lake Tyndall
Lake Welford
Lake Dove
Lake Selina
Lake Julia
Lake Westwood
Lake Gooseneck
Lake Anthony
Lake Whitecliffe
Lake Queens Hd
Lake Renison Bell
Lake Commonwealth Hill
Lake Black Hill
Lake Razorback
Lake Caroline Hill
Lake Dundas
Lake Austral
Lake Oceana
Lake Comstock
Lake Cumberland
Lake Trial Harbour
Lake Remine
Lake Strahan
Lake Regatta Point
Lake Macquarie Hds
Lake Edwards Bay
Lake Surging Pt
Lake Cape Sorell
Lake Neck I
Lake Cat I
Lake Lettes Bay
Lake King Pt
Lake Sophia Pt
Lake Connellys Pt
Lake Yellow Bluff
Lake Fraser Flats
Lake Round Hd
Lake Backagain Pt
Lake Elizabeth I
Lake Betsys Bay
Lake Liberty Bay
Lake Liberty Pt
Lake Table Head
Lake Sloop Pt
Lake Sloop Rks
Lake Coal Head
Lake Macquarie Harbour
Lake Henty Dunes
Lake Misery Flat
Lake Gormanston
Lake Linda
Lake Lynchford
Lake Queenstown Aerodrome
Lake Strahan Aerodrome
Lake Rosebery
Lake Williamsford
Lake Zeehan
Lake Mt Owen
Lake Mt Dundas
Lake Mt Read
Lake Mt Sedgwick
Lake Mt Lyell
Lake Mt Tyndall
Lake Mt Julia
Lake Mt Selina
Lake Mt Murchison
Lake Mt Farrell
Lake Mt Heemskirk
Lake Mt Black
Lake Mt Huxley
Lake Mt Jukes

DESCRIPTION OF THE PROPERTY AND OWNERSHIP

Amoco Minerals Australia Company negotiated a joint venture with CSR Pty Ltd to farm in to a 58 square kilometer portion of EL 15/76 embracing of the prospective Gordon Limestone sequence to the east and southeast of Amoco EL 4/78 (Figure 1). Exploration Licence 15/76 was granted to CSR for the period of six months from August 1976. Renewal of the tenement for further periods of twelve months is subject to Mines Department approval of previous exploration and proposed programs.

Exploration Licence 15/76 was reduced from 145 square kilometers to 124 square kilometers in August 1984. The 21 square kilometers relinquished from the licence were not within the joint venture area and did not include any Gordon Limestone.

The licence is due to expire in August 1987.

HISTORY AND EXPLORATION TO DATE

A detailed description of the mining history and exploration carried out within the joint venture area has been summarized in five previous Amoco progress reports on the CSR Joint Venture, Dundas Tasmania:-

October 1981 to February 1982	Amoco Report 287
January 1982 to June 1982	Amoco Report 311
July 1982 to December 1982	Amoco Report 339
January 1983 to June 1983	Amoco Report 358
July 1983 to December 1983	Amoco Report 376
January 1984 to July 1984	Amoco Report 396

REGIONAL GEOLOGY

Large blocks of Precambrian sediments form the basement complexes of both northwest and central Tasmania. These are overlain by Cambrian volcanics and marine sediments which host the Rosebery-Hercules, Mt Lyell and MacIntosh (Que River) orebodies.

Overlying these rocks is a sequence of Cambrian to Devonian basinal sediments. This sequence hosts the Renison and Cleveland orebodies.

The above units were intruded by granites during the Devonian and Carboniferous times which introduced the tin mineralization. During the Jurassic and Tertiary periods the sequence was blanketed by basic volcanics. Recent fluviatile and Pleistocene glacial erosion have produced the present topography.

Major folding and block faulting are particularly evident in the Zeehan region. Uplift and folding accompanied accumulation of thick piles of sediment and volcanic material in various troughs during the Cambrian period. The Ordovician was marked by the onset of terrestrial and shallow marine sedimentation (the Owen Conglomerate, Moina Sandstone, and Gordon Limestone). The major deformation accompanied the Paleozoic Tabberaberan orogeny and large northwest trending fold structures were formed.

LOCAL GEOLOGY

Minor Precambrian Oonah Formation basement rocks comprised of schists, quartzites, siltstones, shales, spillitic lavas and pyroclastics form an infaulted block within the Cambrian Dundas Group in the central eastern portion of the project area.

Cambrian sedimentation appears confined to fault bounded blocks or graben structures abutting the Precambrian Tyennan Block to the east. The rocks are predominantly rapidly deposited, shallow water sediments including argillites, grits, conglomerates, greywackes and shales with minor cyclical volcanic sedimentation (agglomerates, tuffs and tuffaceous cherts and shales).

The Ordovician to Devonian strata of the Zeehan Basin occur within a series of synclinal structures with northwest axial trends. Mount Zeehan Conglomerate at Mt Misery was deposited

within a graben structure during the upper Cambrian to Lower Ordovician period and is transgressively overlain by micaceous sandstones, siltstones, minor grits, quartzites and shales. These transgressive units are time equivalents of the Moina Sandstone. On a number of the mapped grids, the Moina Sandstone underlies the Ordovician Gordon Limestone with a marked angular unconformity. This is in stark contrast to that observed in detailed mapping of the sequence occurring on the western limit of the basin. The Gordon Limestone is comprised of interbedded limestones and dolomites with numerous debris flow breccia horizons and zones of clastic sedimentation including fossiliferous calc-arenites, siltstones and shales. Siluro-Devonian sediments within the basin are rythmically interbedded fossiliferous shallow marine quartzites (minor siltstones and shales) and dolomitic to pyritic shales and siltstones.

The Zeehan area has been intensely disturbed by the Paleozoic Tabberaberan orogeny which caused major northwest folding and faulting. Some east and northwest trending fault systems are considered growth faults. These give rise to rapid increases in thickness of the carbonate lithologies on the downthrown side of the fault zones and may also act as conduits for mineralizing fluids. North, northeast striking faults are thought to have developed in post Permian times.

MINERALIZATION

Model

Exploration within the prospective Gordon Limestone has been modelled on the Irish type carbonate hosted sedimentary exhalative lead-zinc-silver deposits. Mineralization, lithological and structurally controlled, occurs as both epigenetic and stratiform bodies within carbonate hostrocks. The deposits are found in close proximity to the locus of major basement sutures (growth faults) and similar intersecting extension faults or dilation faults which act as feeder zones for the mineralizing fluids. Coarse and fine grained galena and sphalerite occur with a carbonate matrix.

The stratiform deposits occur as lenses associated with sedimentary shake breccias which have slumped into sub-basinal depressions formed on the down thrown side of the extension

faults and major growth faults. The epigenetic mineralization however is generally found in close proximity to major structures and occurs as veins, veinlets, coarse grained disseminations and small massive sulfide bodies.

Joint Venture Area

Details of the type and extent of mineralization within the joint venture area indicate the major parameters (lithologic, structural and mineralization) fit the Irish model.

At the Mariposa prospect, a distinct horizon containing galena and sphalerite with minor pyrite in a sideritic matrix occurs concordant to bedding (a cerussite-anglesite-ironstone in the oxidized zone). This western zone (drilling results of up to 7 meters of 4.5% lead, 1.2% zinc, and 86.3g/t silver) occurs within a down faulted block of limestone and shake breccias which appears to be connected through high angle extension faults to the major northwest trending structure, the Balstrup Fault. The Balstrup Fault cuts the Zeehan basin to the north of the Oceana mine and is thought to have been an active feeder zone for mineralizing fluids. An eastern mineralized zone (drill results of up to 12 meters of 2.0% lead, 1.5% zinc and 48.4g/t silver) appears to be structurally related to the faulted contact between the Ordovician Limestone and Cambrian sediments.

Shake breccias and minor clastic units within the Gordon Limestone have been observed during the trenching program on the Bannockburn prospect. Two separate zones of mineralization occur in a similar stratigraphic level as the western zone on the Mariposa prospect. Costean values for the southern most zone returned moderate values assaying to 16 meters of 2.4% lead, 1.2% zinc and 13 g/t silver, however the northwestern zone returned highly anomalous values with 22 meters assaying 3.1% lead, 3.9% zinc and 34 g/t silver. Within this anomaly 6 meters assayed 5.4% lead, 9.7% zinc and 74 g/t silver from a zone of fine

grained galena sphalerite interbedded with fissile shaley dolomites and minor breccias. Both zones of mineralization lie in close proximity to major structures which may have acted as conduits for mineralizing fluids.

Breccias have also been observed on the Black Jacks prospect associated with predominantly zinc rich (costean results of up to 4 meters of 0.4% lead, 5.0% zinc and 8 g/t silver) mineralization which occurs within a structurally bound block of limestone. A number of major east-west and north-west trending structures cut the prospect with limestone thicknesses invariably thickening on the down thrown side indicating possible growth faulting. Dolomites in the zinc rich area contain laminar syngenetic pyrite interbeds averaging approximately 10% but varying up to 40% over narrow widths.

Costean results from the Professor prospect have defined a zone of anomalous geochemistry (assaying up to 4 meters of 1.3% lead, 2.2% zinc and 11g/t silver) over a strike length of 400 meters. This zone occurs at a similar stratigraphic position to the defined mineralization at both Mariposa and Bannockburn prospects. A major northwest trending fault which cuts through the grid has lead-zinc-barium mineralization associated with it on the adjoining EL 4/78. This fault may represent a major mineralizing conduit for the region.

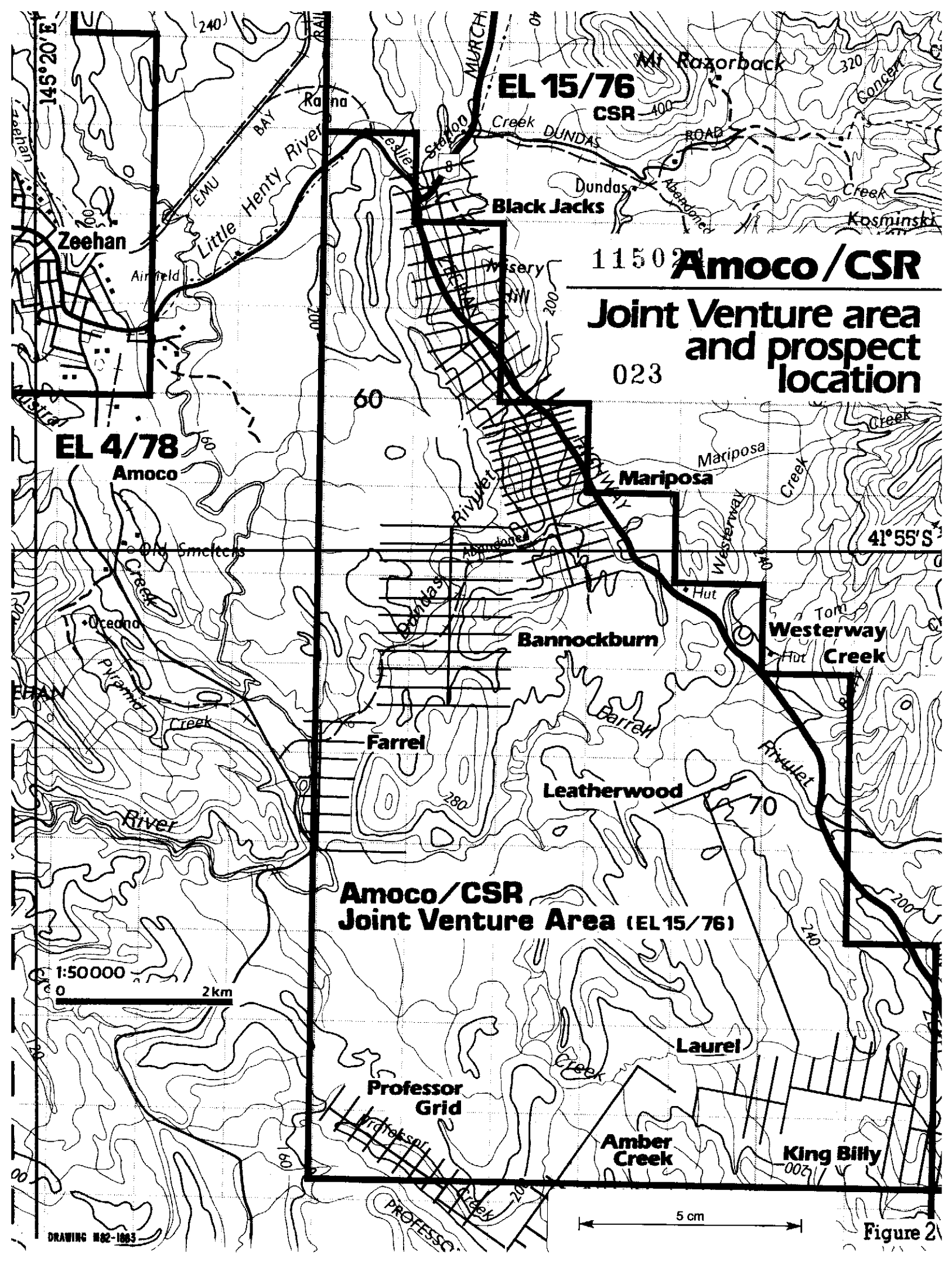
Although drilling to date has not intersected economic mineralization the similarities in geological setting and observed mineralization between the joint venture area and the Irish deposits indicates the potential for discovering a large tonnage syngenetic sedimentary lead-zinc-silver orebody, or alternatively a number of moderate tonnage orebodies.

WORK CONDUCTED BY AMOCO

Work during the period included diamond drilling, minor gridding and bedrock sampling, surface and downhole geophysical surveys, consultant geochemical studies and rehabilitation of costeans. Figure 2 shows the location of prospects within the joint venture area.

Gridding

Minor infill gridding at the Black Jacks, Mariposa and Bannockburn prospects was completed in order to enable completion of a Wacker bedrock sampling program. A detailed grid was established at the Sunny Corner prospect (Bannockburn grid) to provide complete EM and Wacker coverage over the prospective horizon.


145°20'E
EL 15/76
CSR
Mt Razorback
Concert
ROAD
DUNDAS
Creek
Dundas
Abandoned
Black Jacks
Kosminski
Creek
Zeehan
Airfield
Little Henty River
EMU
BAY
Rafina
Stanley
MURCH
Misery
Hill
11502
Amoco/CSR
Joint Venture area and prospect location
023
EL 4/78
Amoco
Mariposa
Creek
Mariposa
Rivulet
Abandoned
Old Smelters
Creek
41°55'S
Westerway
Creek
Hut
Tom
Westerway
Creek
Hut
Oceana
Bannockburn
Pyramid
Creek
Barren
Rivulet
Farrel
Leatherwood
River
Amoco/CSR
Joint Venture Area (EL15/76)
1:50000
0
2km
Laurel
Creek
Professor
Grid
Amber
Creek
King Billy
PROFESSOR
Creek
5 cm
DRAWING NO2-1883
Figure 2

Diamond Drilling

Diamond drilling totalling 2162 meters was completed on the Black Jacks, Mariposa and Bannockburn grids. Drillhole locations are plotted on Enclosures 1, 2 and 3. A summary of all holes is listed below and significant intersections listed in Table 2. Detailed logs and sections are included as Appendices 1 and 2.

TABLE 1

DUNDAS - 1984 DIAMOND DRILLING DETAILS

Prospect	Hole	Co-ordinates North	East	Decln (°)	Azimuth (°T)	Total Depth (m)
Black Jacks	DTBJ-84-1	60830:	67225	-40	75	102.5
Mariposa	DTM-84-1	58800:	67248	-52	72	126.0
	DTM-84-2	58950:	66999	-60	72	186.0
	DTM-84-3	58825:	67288	-40	72	70.0
	DTM-84-4	59193:	67310	-40	72	77.3
	DTM-84-5	59200:	67160	-40	252	145.7
	DTM-84-6	59075:	67170	-45	252	238.0
	DTM-84-7	59419:	67300	-45	72	65.5
	DTM-84-8	59600:	67214	-45	252	112.0
	DTM-84-9	59158:	67040	-60	72	200.0
Bannockburn	DTB-84-1/1A	56900:	65699	-50	91	212.7
(Sunny Corner)	DTSC-84-1	57781:	65388	-45	40	70.0
	DTSC-84-2	57807:	65356	-45	30	70.2
	DTSC-84-3	57800:	65870	-45	91	72.1
	DTSC-84-4	57905:	65620	-45	251	105.0
	DTSC-84-5	5805A:	65420	-45	222	54.0
	DTSC-84-5A					

TABLE 2

DUNDAS - 1984 DIAMOND DRILLING - SIGNIFICANT INTERSECTIONS

Prospect	Hole	From	To		Interval (m)	Pb (%)	Zn (%)	Ag (g/t)	Ba (%)
Black Jacks	DTBJ-84-1					No significant assays			
	DTBJ-84-2					No significant assays			
Mariposa	DTM-84-1					No significant assays			
	DTM-84-2	131	151	=	20	2.5	0.9	43.4	0.3
	incl	133	140	=	7	4.5	1.2	86.3	0.2
	DTM-84-3	21	24	=	3	0.6	0.2	36	-
		28	31	=	3	0.2	1.4	5	-
	DTM-84-4	41	42	=	1	0.4	0.7	4	-
		57	58	=	1	0.5	1.5	13	-
		70	71	=	1	4.1	2.45	28.0	-
	DTM-84-5	44	53	=	9	1.2	1.6	21.4	-
	DTM-84-6	158	166	=	8	3.0	0.4	44.8	0.5
	incl				4	3.6	0.5	52	-
	and				2	4.3	0.6	52.5	-
	DTM-84-7	8	20	=	12	2.0	1.5	48.4	-
	incl				8	2.4	2.0	64	-
	DTM-84-8	37	38	=	1	2.6	5.3	14	-
	DTM-84-9	37	46	=	9	6.4	0.9	53.2	-
	incl				2	12.5	0.8	77.5	-
Bannockburn	DTB-84-1/1A					No significant assays			
(Sunny	DTSC-84-1	11	13	=	2	0.8	0.5	25	-
Corner)		15	16	=	1	0.6	1.1	4	-
		19	20	=	1	0.01	1.1	<1	-

Prospect	Hole	From	To	Interval (m)	Pb (%)	Zn (%)	Ag (g/t)	Ba (%)
(Sunny Corner)	DTSC-84-2				No significant assays			
	DTSC-84-3	52	64	= 12	2.1	0.3	25.8	-
	DTSC-84-4	66	67	= 1	1.4	0.7	4	-
	DTSC-84-5				No significant assays			

Black Jacks:
DTBJ-84-1 was drilled to test the source of 16 meters of 0.2% lead, 1.9% zinc and 4.3 g/t silver costean geochemistry. Gordon Limestone was encountered to 102.5 meters with a trace of galena and sphalerite in calcite veins.

DTBJ-84-2 was drilled to test the source of 26 meters of 1.56% lead, 0.91% zinc and 8.15 g/t silver costean geochemistry.

Mariposa:
DTM-84-1 was drilled to test the source of 22 meters of anomalous costean geochemistry including 6 meters of 6.2% lead, 5.5% zinc and 257 g/t silver. The hole encountered Gordon Limestone to 113 meters with a trace of galena/sphalerite in siderite and dolomite veins. A fault zone was encountered between 113 and 119 meters with anomalous lead/zinc geochemistry, then from 119 to 126 meters the Dundas Formation was intersected.

DTM-84-2 was drilled to test gravity and IP anomalies over the Mariposa workings. Crotty Quartzite was intersected to 53 meters then Gordon Limestone to the end of the hole. Mineralization (Table 2) was in a zone of intense siderite calcite and dolomite.

DTM-84-3 was drilled to test an eastern mineralized zone 25 meters north of hole DTM-84-1 at less than 25 meters vertical depth. Gordon Limestone was encountered to 66 meters where the

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Drilling diamond holes DTM-84-9 at Mariposa (top) and hole DTB-84-1 at Bannockburn

mineralization (Table 2) occurs within siderite/calcite veins in a dolomitized, brecciated limestone sequence. From 66 meters to end of hole the Dundas Formation was encountered.

DTM-84-4 was drilled to test 8 meters of 3.3% lead, 6.2% zinc and 395 g/t silver costean geochemistry and an associated VLF anomaly. Gordon Limestone was enountered to 73 meters with mineralization occurring within calcite/siderite veins in variably weathered dolomitized and brecciated limestone. From 73 to 77 meters the Dundas Formation was encountered with minor silicification associated with a fault zone at 73 meters.

DTM-84-5 was drilled to test the source of costean geochemistry of 22 meters of 1.0% lead, 0.2% zinc and 63.6 g/t silver. The entire hole was in Gordon Limestone and the mineralization occurs as variably oxidized galena and sphalerite in clays. Clay probably represents a completely weathered limestone sequence.

DTM-84-6 was drilled to test the continuity of mineralization intersected in hole DTM-84-2 and designed to cut the mineralized horizon at a vertical depth of 130 meters. Gordon Limestone was encountered in the entire length of hole with mineralization between 158 and 166 meters.

DTM-84-7 was drilled to test costean geochemistry of 14 meters of 1.06% lead, 2.32% zinc and 34.4 g/t silver. Moderately to intensely weathered Gordon Limestone was intersected to 59 meters with minor galena and sphalerite disseminated within the limestone. Mineralization was encountered from 8 to 20 meters and the hole was terminated in the Dundas Formation.

DTM-84-8 was drilled to test the source of 8 meters of 1.35% lead, 1.11% zinc, 19.6 g/t silver and 14 meters of 1.36% lead, 3.05% zinc, 16.6 g/t silver costean geochemistry plus anomalous deep bedrock (Marlow) sampling. Variably weathered and

dolomitized Gordon Limestone was encountered throughout the hole with traces of coarse galena and sphalerite as slugs. Mineralization is detailed in Table 2.

DTM-84-9 was drilled to test the mineralized horizon intersected in holes DTM-84-2, 5 and 6 at a vertical depth of 90 meters. Crotty Quartzite was encountered to 28 meters then Gordon Limestone to the end of the hole. The limestone is intensely weathered between 28 and 48 meters and between 36.5 to 45.5 meters includes a zone of 5 to 10% galena sphalerite in a coarse dolomite-siderite host. Mineralization between 37 and 46 meters is detailed in Table 2.

Bannockburn:

DTB-84-1/1A was drilled to test the source of 26 meters of 1.8% lead, 0.8% zinc and 10.8 g/t silver costean geochemistry. Crotty Quartzite was encountered to 69 meters then Gordon Limestone to end of hole. There is a trace of galena and sphalerite in heavily dolomitized limestone but no significant results were obtained.

DTSC-84-1 was drilled at Sunny Corner to test costean geochemistry of 22 meters of 3.1% lead, 3.9% zinc and 34.3 g/t silver. Gordon Limestone was encountered throughout the hole with mineralization patches (Table 2) occurring between 11 and 20 meters. The mineralization occurs as disseminations of galena and sphalerite in a completely weathered limestone matrix. A cave fill deposit occurs at the projected target depth.

DTSC-84-2 was drilled to test the source of costean geochemistry of 14 meters of 0.6% lead, 1.25% zinc, 9 g/t silver and to intersect mineralized sedimentary breccia found in the costean. Gordon Limestone was encountered throughout with no significant intercepts. Cave fill deposits occur at the projected target depth.

DTSC-84-3 was drilled to test under old workings at 57800N:67915E. Crotty Quartzite was encountered to 43 meters then Gordon Limestone to the end of hole. The limestone is variably weathered and silicified and minor galena occurs in clays associated with quartz vein fragments. Mineralization is detailed in Table 2.

DTSC-84-4 was drilled to test under the old Sunny Corner workings. Crotty Quartzite was encountered to 46 meters then variably weathered, strongly dolomitized Gordon Limestone with trace to minor galena and sphalerite in dolomitic vugs and veins. Mineralization is detailed in Table 2.

DTSC-84-5 was drilled to test costean geochemistry of 6 meters of 3.64% lead, 0.46% zinc, 6 g/t silver and extensive ironstone. Crotty Quartzite was encountered to 44 meters the highly weathered Gordon Limestone with a trace of galena. The hole was stopped due to downhole caving.

In general the results of the drilling program were disappointing. The best results came from the Mariposa grid in an area that had been partially drill tested by North Broken Hill in 1951. The recent program has defined a sub-economic deposit with a strike length of over 350 meters, depth extent of at least 120 meters and average width/grade of 7 meters of 4% lead-zinc and 40g/t silver. Figure 3 shows the mineralized horizon at 0, -50 and -100 meter levels.

Some of the best costean results had come from the Sunny Corner area (22 meters of 3.1% lead, 3.9% zinc and 34.3g/t silver), however the drilling failed to intersect any significant mineralization. It should be noted that two of the holes at Sunny Corner intersected karst fill deposits at the inferred mineralized horizon while another hole, DTSC-84-5/5A intersected

within Part EL 15/76

67050 E

59200 N

59100 N

59000 N

58900 N

DTM-84-5

DTM-84-9

DTM-84-6

NBH-5

NBH-4

NBH-6

NBH-8

NBH-7

NBH-9

NBH-10

DTM-84-2

MMDDH-4

FAULT

FAULT

	Surface	(R.L. 105 m)
	-50m	(R.L. 55 m)
	-100m	(R.L. 5m)

MARIPOSA MINERALIZED HORIZON

Levels 0, -50, -100 meters

scale 1:1000

5 cm

RSK

FIGURE 3

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a sideritized acid volcanic unit which indicates the Sunny Corner area may be an area of anomalous thermal activity and still has potential for hosting syngenetic mineralization.

The drilling at Black Jacks and Bannockburn failed to intersect any significant mineralization and they appear to have minimal potential for hosting Irish style mineralization, although DTB-84-1A intersected a slump breccia unit at the base of the hole which may indicate a favorable geologic environment.

Assay results for all drillholes show elevated levels of lead and zinc indicating the Gordon Limestone is an anomalous sequence and potential still exists for the discovery of a large deposit. The high ratio of lead to zinc (3:1) may indicate close proximity to the vent or epigenetic phase of mineralization and future exploration should be directed towards deeper parts of the basin where large zinc rich stratiform bodies may have developed.

Geophysics

Gamma Logging:

Fifteen drillholes were surveyed by Mitre Geophysics. Although the holes had been cased using PVC piping, several were blocked and resulted in incomplete downhole surveys. Proper correlation of the limestone between drillholes has not been possible due to incomplete results and probable lateral facies variations. The basal sequence of the Crotty Quartzite is defined by a zone of elevated counts which dips off sharply at the contact with Gordon Limestone. Data sheets are included as Appendix 3.

PEM:

Crone Geophysics was contracted to complete downhole PEM surveys at Black Jacks, Mariposa and Sunny Corner with an additional surface survey at Sunny Corner (Appendix 4). The only significant response was recorded in hole DTM-84-9. It is interpreted to be a poor conductor lying below the hole, dipping to the west and conformable to bedding, however it is not large

enough to warrant drill testing. A full report on the EM survey is included in Appendix 5. At this stage, no drill targets have been recommended on the joint venture area.

VLF:
The Black Jacks, Mariposa and Bannockburn grids were surveyed with VLF using both Japan and North-West Cape as signal sources. Good correlation is evident between VLF anomalies and anomalous soil sampling/trenching results and/or major faults. A full report is included in Appendix 5.

Data Compilation:
Mitre Geophysics has produced a compilation of previous Amoco geophysical surveys on the Mariposa Grid. This report is included as Appendix 5.

Geochemistry

Bedrock Geochemistry:
Wacker percussion bedrock sampling was completed on several lines at Black Jacks, Mariposa and Sunny Corner. The Wacker (Marlow Flow-through Sampling Unit) has greater penetration capabilities than the Jackro auger and in addition, will normally provide a small sample of fresh bedrock. A comparison of both sampling results for typical lines is tabled below.

TABLE 3 - COMPARISON OF JACKRO AND WACKER SAMPLING

Mariposa Grid
Line 5880N - sample depth in brackets (meters)
- values in ppm unless noted

	Lead		Zinc		Geology
Easting	Jackro	Wacker	Jackro	Wacker	
67125	180 (2.5)	65 (5.3)	36	90	
67150	1300 (1.0)	135 (1.6)	40	50	

TABLE 3 (Cont'd)

	Lead		Zinc		Geology
Easting	Jackro	Wacker	Jackro	Wacker	
67175	120 (5.0)	20 (5.3)	350	22	
67200	190 (5.0)	24 (1.2)	210	20	
67225	175 (<0.1)	12 (12.2)	480	18	
67250	44 (1.0)	20 (1.6)	38	32	
67275	185 (1.0)	38 (1.5)	90	70	
67300	32 (1.0)	30 (1.8)	8	1800	Gordon Limestone
67325	340 (5.0)	70 (13.3)	360	1200	Fault Zone
67350	810 (5.0)	60 (8.6)	450	30	Dundas Foundation
Line 59600N					
67150	-	490 (4.8)	-	50	
67175	145 (4.0)	1.13% (5.0)	60	3400	
67200	7800 (5.0)	6600 (13.8)	1.65%	7500	
67225	1350 (5.0)	290 (20.6)	1000	660	
67250	560 (1.9)	55 (25.0)	360	105	
67275	330 (5.0)	130 (11.8)	250	380	
67300	190 (5.0)	180 (12.3)	270	150	Gordon Limestone
67325	4400 (5.0)	95 (11.8)	4000	510	Fault Zone?
67350	60 (0.75)	320 (22.4)	75	1500	Dundas Foundation
67375	95 (5.0)	60 (3.4)	260	50	
67400	44 (1.0)	26 (2.8)	104	65	
Line 61200N					
67000	<4 (5.0)	10 (12.5)	2	8	
67025	22 (5.0)	16 (9.5)	32	18	Crotty Quartzite

TABLE 3 (Cont'd)

Easting	Lead Jackro	Lead Wacker	Zinc Jackro	Zinc Wacker	Geology
67050	100 (2.0)	26 (9.4)	50	42	Fault Zone
67075	8 (5.0)	300 (8.0)	<2	38	Gordon Limestone
67100	10 (5.0)	520 (9.0)	<2	30	
67125	28 (5.0)	60 (13.0)	6	280	
67150	6500 (2.0)	810 (17.4)	10	910	
67175	70 (3.5)	36 (4.7)	330	130	
67200	190 (2.0)	115 (5.8)	220	440	
67225	220 (2.5)	70 (10.7)	430	260	
67250	830 (3.5)	4100 (3.6)	1550	2400	

Soil profiles using the Wacker sampling unit were taken adjacent to two costeans at the Black Jacks and Sunny Corner prospects. Samples were taken at depth intervals of two or three meters from surface to bedrock. Very little geological information can be obtained due to the small sample size but the bedrock geochemistry shows a probable down-slope blooming effect. The profiles show why the costean and jackro assay results can be misleading (Appendix 6). The data also indicated DTSC-84-1 may have overshot the mineralized horizon.

The Wacker system was used to sample 1.9 line kilometers of the Black Jacks grid. The lines were designed to test a thickened area of limestone north of a major fault. Assay results were generally low and no geochemical trends were evident. Some spotty anomalous values of up to 7700 ppm zinc and 4100 ppm lead were recorded, however no additional sampling is planned for the area (Appendix 6).

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The 'Wacker' percussion unit used for bedrock sampling at Black Jacks, Mariposa and Sunny Corner

The Wacker system was used to sample 1.45 line kilometers at Mariposa. The lines covered areas where thick river gravels had resulted in poor sampling by the Jackro system. Anomalous values (up to 1.3% lead, 0.75% zinc) were associated with old workings on line 59600N and along the Ordovician-Cambrian faulted contact. These areas of anomalous geochemistry have been subsequently tested by the drilling program.

Wacker samples were also taken over 1.7 line kilometers on the new Sunny Corner grid (Appendix 6). The sampling was necessary because the original grid lines in this area run parallel to geological strike resulting in very poor geochemical coverage of the Gordon Limestone. Assay results for the area are quite anomalous (up to 2.5% zinc and 3.2% lead) the highest values occurring near the Crotty Quartzite/Gordon Limestone contact over a strike length of more than 400 meters. Holes DTSC-84-5A and DTSC-84-4 have partially tested this zone.

Costeaning

Four trenches totalling 308 meters were excavated at the Professor prospect over zones of anomalous bedrock geochemistry defined by the Jackro auger sampling program. Costean profiles are included as Appendix 7. Mineralization occurs over a strike length of 400 meters and is open to the north. It is associated with dolomitic sequences near the Crotty Quartzite/Gordon Limestone contact. Best results are:

Line 50900N 6516-218E = 2m of 0.03% Pb, 1.17% Zn, <0.5 g/t Ag
65354-360E = 6m of 0.5% Pb, 0.8% Zn, 2 g/t Ag

Line 51100N 65278-286E = 8m of 1.4% Pb, 0.5% Zn, 6 g/t Ag
65294-298E = 4m of 0.9% Pb, 0.5% Zn, 5 g/t Ag

Line 51300N 65362-366E = 4m of 1.26% Pb, 2.18% Zn, 11 g/t Ag

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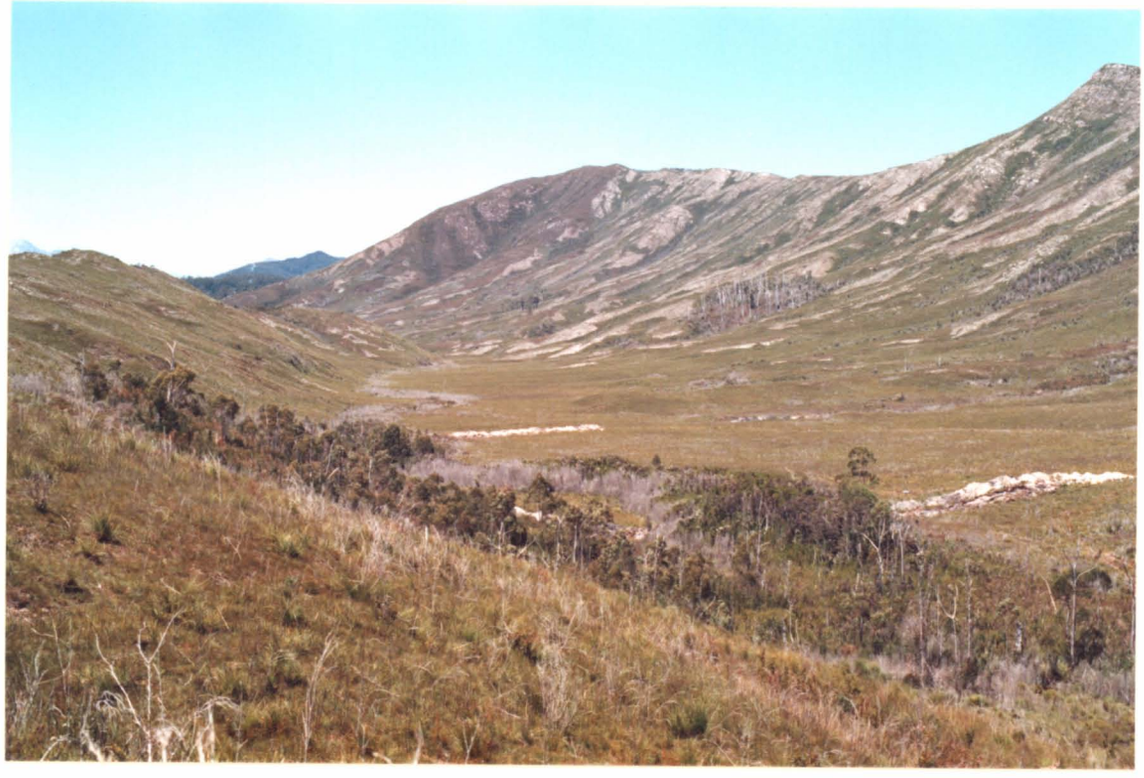
Looking north along the Black Jacks prospect from about Line 61100N to the junction of the Zeehan and Murchison Highways



Looking southeast across the costeans on the Professor Range prospect

Locon Wall Report

A consultant geochemist (Locon Wall) was contracted to study costean and diamond drilling results following the failure of most drillholes to intersect mineralization which had been indicated by the costean geochemistry. His work indicates the surface geochemistry within the black pug (weathered limestone) represents up to a four fold increase in the actual base metal content of fresh limestone. That is, the high level of surface geochemistry represents residual deposits of sulfides in clay following removal of the carbonate from an original silty limestone. A full report is included as Appendix 8.

Sirotope

Thirteen diamond drill core and sulfide rich surface samples from the joint venture area were analyzed for lead isotopes by the CSIRO. The results indicate the age of mineralization is Cambrian to Ordovician (Rosebery/Oceana style) and not Devonian (Queen Hill Vein or Farrel style), therefore the mineralization is syngenetic or syndigenetic. A complete report is included as Appendix 9.

Petrology

Eighteen core and costean samples were submitted to Minpet Services in Sydney for thin and polished section desciptions. Results of the study indicate there are several textural and lithological similarities with the Irish style of mineralization and there is evidence for both bedded and infilled sulfides in the Dundas area. Reports are included as Appendix 10.

Costean Rehabilitation

A consultant botanist, Dr Frank Podger was contracted to study costeans on the joint venture area and make recommendations for their rehabilitation (Appendix 11). Using an excavator contracted from Groves Contracting of Renison Bell, most of the costeans (and some drill tracks) have been infilled and restored

to a state capable of regeneration. The restoration program has been very successful and feed-back from several sources regarding the quality of work has been very positive. Any costeans which are still open will be infilled early next summmer.

EXPLORATION POTENTIAL

The tenement is still considered to have excellent potential for the location of Irish style carbonate hosted lead-zinc orebodies.

Exploration to date has concentrated on the northern sedimentry basin which contains approximately one-third of the total limestone in the tenement. The larger southern basin has received only minor exploration emphasis and future work should be concentrated in this area. The current work by EZ on the adjoining EL 4/78 in this same basin has defined a number of zinc and lead anomalies indicating the potential of the area. Work conducted by EZ has also indicated this southern basin is more zinc-rich than the northern basin. The proposed exploration program would concentrate on this southern area of the tenement.

PROPOSED PROGRAM

The proposed program involves completing approximately 12 kilometers of reconnaissance line geochemical sampling using the Wacker bedrock sampling tool and a structural interpretation of the area by a structural consultant.

SIGNED: .....

GL KARY

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AMOCO MINERALS AUSTRALIA COMPANY

DUNDAS

EXPENDITURE FROM JULY 1, 1984 TO JUNE 30, 1985

Salaries and Wages	43,558.19
Drafting	10,365.90
Cookery	12,735.96
Field Office Rent	2,458.27
Field Supplies	4,731.58
Freight	3,158.53
Travel	3,442.63
Communications	2,949.62
Geophysics	13,275.74
Consultants/Contractors	53,547.33
Equipment Operation & Rental	37,445.60
Assays	4,327.75
Drilling	86,408.55
Property Payments	113.92
	278,519.57
Overhead	27,851.97
	$306,371.54

T.J. CONQUEST
ACCOUNTANT 261

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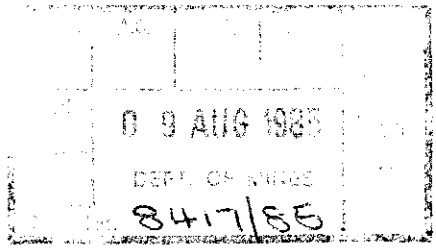

DISTRIBUTION

- ● CSR - Mines Department
- o CSR - Hobart Office
- o CSR - Sydney Office
- o Denver
- o Sydney
- o Field
- o Spare

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APPENDIX 1

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DIAMOND DRILL LOGS - DTBJ-84-1 AND 2 , DTM-84-1 TO 9,
DTB-84-1/1A AND DTSC-84-1 TO 5A

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Amoco Minerals Australia Company

DRILLHOLE Nº DTBJ-84-1 Page 1 of 4

drill log metric

PROJECT DUNDAS TAS. Nº A84-109	ELEVATION	COMMENCED 27/7/84	HOLE SURVEY Depth	Dip	Bearing
PROSPECT BLACK JACKS	DIP COLLAR -40°	COMPLETED 3/8/84	No Surveys. Unable		
CO-ORDINATES 60830 N 67225 E	CORE SIZE HQ	TOTAL LENGTH 102.5m	to case hole		
BEARING 090 G 080° M 091° T	LOGGED BY G. Kary	Realine Used MINDRILL 10L B.A.D. Poly	with P.V.C	pipe	

METERAGE From	To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	To	Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
0	3.0	HW ROLLER:											
		ORDOVICIAN - GORDON LIMESTONE											
3.0	15.6	Limestone / Dolomite ? c/w:	Trace pyrite throughout	112154	3	4	1	20	640	3450	2	36	230
		Black non-calcareous poorly bedded clay, may represent completely weathered dolomite or limestone		112155	4	5	1	18	530	2750	1	36	270
				112156	5	6	1	26	620	6900	2	36	350
				112157	6	7	1	24	740	4850	2	30	320
				112158	7	8	1	22	1450	7250	5	40	520
15.6	20.1	Argillaceous Dol-Lutite ? c/w:	1-2% very fine grained pyrite throughout	112159	8	9	1	28	2950	1·35%	4	34	370
		Greenish-black silty clay, slightly oxidized, may represent completely weathered argillaceous dol-lutite		112160	9	10	1	20	280	2700	1	38	250
				112161	10	11	1	22	1250	4200	5	28	420
		40-50% core recovery		112162	11	12	1	24	1750	6600	4	26	380
				112163	12	13	1	24	1250	4300	2	24	350
				112164	13	14	1	22	165	720	1	20	310
20.1	21.6	Cavity:		112165	14	15	1	16	280	2250	1	26	410
				112166	15	16	1	16	125	1850	1	28	400
21.6	32.1	Interbedded Calc-Lutite and Dol-Lutite		112167	16	18	2	10	380	5350	2	30	105
		Grey calc-lutite with 2-3 cm bands of black argillaceous dol-lutite. Core		112168	18	19	1	10	600	9250	2	44	85
				112169	19	20	1	14	750	4800	2	40	115
		badly broken. Core recovery variable from 15% to 70%											
32.1	33.6	Cavity:											
33.6	35.5	Bioclastic Calc-Arenite	Trace pyrite associated with fossil clusters. Probably secondary pyrite.										
		Grey, clusters of fossil fragments in a calc-arenite matrix. Minor calcite veinlets. Core badly broken, 50-60% recovery.											
35.5	37.2	Interbedded Calc-Lutite and Dol-Lutite:											
		Grey calc-lutite interbedded with dark grey to black argillaceous dol-lutite											

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DRILLHOLE Nº DTBJ-84-1 Page 2 of 4

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
35.5 cont.	37.2	Minor soft sediment deformation evident. 40-50% core recovery.						
37.2	38.7	Bioclastic Calc-Arenite: Interbedded grey and black. Fossil fragments generally 1-2mm, minor shell fragments to 5mm. Grades into underlying heavily slumped unit.						
38.7	40.1	Slumped Bioclastic Calc-Arenite: - as 37.2-38.7m showing soft sediment deformation.						
40.1	41.4	Calc-Arenite: Well bedded, light grey, 5% quartz grains. Minor bioclasts. Minor stylolites. Bedding - 60° to C.A. @ 40.8m						
41.4	45.8	Interbedded Calc-Arenite and Dol-Lutite: Grey calc-arenite, 5% quartz sand interbedded with black argillaceous dol-lutite. Bedding - 65° to C.A. @ 42.4m	Trace fine grained pyrite disseminated in argillaceous beds.					
45.8	48.8	Interbedded Calc-Lutite and Dol-Lutite: Slightly sheared grey calc-lutite and black argillaceous dol-lutite. Cleavage developed @ 35-40° to C.A.						
48.8	51.6	Variably Bioclastic Calc-Arenite: Interbedded grey bioclastic calc-arenite and slightly fossiliferous black calc-arenite. Bioclastic beds partially weathered to clay.						
51.6	53.1	Cavity						

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DRILLHOLE Nº DTBJ-84-1 Page 3 of 4

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
53.1	54.9	Interbedded Calc-Lutite and Dol-Lutite: Grey calc-lutite and black argillaceous dol-lutite highly weathered to clays. 70% core recovery											
54.9	57.4	Bioclastic Calc-Arenite: Grey, minor calcite veinlets, highly weathered to clay. 60-70% core recovery											
57.4	60.0	Dol-Lutite: Black, argillaceous, minor thin dol-arenite beds. Poor core recoveries 57.6 - 59.1 - 10% core recovery		112175	59	60	1	8	210	730	2	950	145
				112176	60	61	1	7	80	100	2	430	75
60.0	69.6	Variably Bioclastic Calc-Arenite: Grey bioclastic calc-arenite interbedded with black, slightly argillaceous calc-arenite. Bioclasts are mainly shell fragments with some coral. Moderate soft sediment deformation evident. Minor stylolites. 50% core recovery overall 63.6 - 65.1 - 5-10% recovery 68.1 - 69.6 - 5-10% recovery Minor calcite veins (1-2 cm wide) at 25° to C.A. (60° - 40° to apparent bedding)	Trace sphalerite in calcite vein at 62.7m, 66.6m. Sphalerite is a honey to yellow colour	112170	61	62	1	7	90	95	2	410	85
				112171	62	63	1	8	80	320	2	620	70
				112172	63	65	2	7	55	100	1	410	90
				112173	65	66	1	7	60	125	2	220	100
				112174	66	67	1	7	70	440	2	300	50
69.6	74.1	Calcareous Sandstone: Black, fine grained, well bedded, variably calcareous 72.6 - 73.0 - thin coquina bed Bedding 75° to C.A. @ 72.8m	Trace pyrite along fracture planes										
74.1	75.6	Calcareous Mud: Black to grey <5% core recovery											

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Amoco Minerals Australia Company

DRILLHOLE NO DTBJ-84-1 Page 4 of 4

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE NO	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
75.6	77.1	Caucty						
77.1	83.1	Slump/Fossil Breccia: Grey coral and minor shell fossils and bioclasts in a black argillaceous dol-lutite matrix. Fines downwards. Corals slightly weathered. 81.6 - 83.1 40-50% core recovery.						
83.1	86.6	Laminated Sandstone: Grey to dark grey slightly calcareous fine sandstone to siltstone. Finely laminated. Bedding - 75° to C.A. @ 83.5m						
86.6	88.4	Interbedded Calc-Lutite and Dol-Lutite: Grey calc-lutite with dark argillaceous dol-lutite to dol-arenite. Minor graded bedding. Abundant carbonaceous stringers at 0° to C.A. Bedding - 70° to C.A. @ 88.2m	Trace sphalerite along carbonaceous stringers.					
88.4	93.7	Bioclastic Calc-Lutite to Calc-Arenite: Slumped bioclastic calc-lutite into calc-arenite. Minor calcite veins. Large coral at 89.4m (10cm long).	Trace pyrite in black calc-arenite					
93.7	96.8	Dol-Arenite: Black, massive, 50-60% core recovery						
96.8	102.5	Calc-Lutite: Variably slumped, interbedded grey and black. Minor fossil component. Large coral (10-15cm) at 99.4m. Minor calcite veining	Trace pyrite in black calc-lutite					
E.O.H.		Hole stopped at 102.5m, drilling difficulties. Hole caved at 30m.						

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DRILLHOLE Nº DTBJ-84-2 **Page** 1 **of** 3 **drill log** metric

PROJECT DUNDAS TAS. Nº A84-109	**ELEVATION**		**COMMENCED** 4|8|84	BORE HOLE SURVEY		Eastman	Single Shot		B.R.D. Pty Ltd		
PROSPECT BLACKJACKS	**DIP COLLAR** -45°		**COMPLETED** 13|8|84	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing
CO-ORDINATES 61050 N 67160 E	**CORE SIZE** HQ		**TOTAL LENGTH** 98.5m	30m	-46°	064° m						
BEARING 090 G 064°M 075°T	**LOGGED BY** G. Kary		Machine Used MINDRILL 10L 2&D Pty Ltd	60m	-46°	064°						
				80m	-45°	065°						

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
0	3	HW Roller											
		SILURIAN - CROTTY QUARTZITE											
3	11.5	Quartzite: Light grey to pale brown, fine grained. Well bedded. Minor bitumen along fracture planes. Bedding 75° to C.A. @ 5.0m; 70° to C.A. @ 6.0m; 80° to C.A. @ 9.0m											
11.5	12.5	Caulty:											
12.5	14.2	Siltstone / Shale H/W: Dark brown siltstone, highly weathered, with thin bands of black highly weathered shale. Minor slumping of shale horizons. 70% core recovery											
14.2	15.5	Sandstone C/W: Pale green to light grey, fine grained completely weathered to sand. 60% core recovery											
15.5	17.5	Siltstone? C/W: Dark grey to black massive clay. Probable completely weathered siltstone. 50% core recovery		113161	15	17	2	95	840	280	2	6	350
17.5	23.1	Sandstone: Light grey fine grained sandstone fragments in a orange clay matrix (weathered sandstone?)		113162	17	20	3	140	420	380	5	8	260
				113163	20	23	3	80	44	55	2	4	240

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Amoco Minerals Australia Company

DRILLHOLE Nº DTBJ-84-2 Page 2 of 3 **drill log** metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
		ORDOVICIAN - GORDON LIMESTONE											
23.1	35.3	Calc-Lutite?:	Up to 1% pyrite	113164	23	24	1	55	750	3400	1	22	420
		Completely weathered to black	as disseminations	113165	24	25	1	20	270	1600	1	26	430
		argillaceous, non-calcareous clay. Possible	with trace galena	113166	25	26	1	28	540	780	2	18	540
		veinlet textures evident. Poor core	along probable	113167	26	27	1	46	540	1800	3	10	520
		recovery, 30-40% overall	bedding planes.	113168	27	28	1	20	660	1850	2	32	370
		28.2-29.5 - Caving		113169	28	34	6	22	540	3000	2	2000	240
		31.0 - 32.5 - Caving											
		32.5 - 34.0 - 25% recovery											
35.3	44.5	Dolomite:		113170	34	37	3	24	850	7750	3	260	620
		Dark grey, finely crystalline, core badly		113171	37	45	8	8	165	590	2	960	125
		broken. Poor core recovery											
		35.5 - 37.0 m - 10%											
		37.0 - 41.5 m - Caving											
		41.5 - 43.0 m - 10-15%											
		43.0 - 44.5 m - Caving											
44.5	55.0	Calc-Arenite:		113172	45	46	1	14	470	2400	2	550	100
		Dark grey, fine sandy. Very poor		113173	46	47	1	8	340	970	2	480	115
		core recoveries.		113174	47	55	8	6	100	490	2	1500	85
		47-47.5 - 30%											
		47.5-50.5 - Caving											
		50.5-52.0 - <5%											
		52.0-53.5 - Caving											
		53.5-55.0 - 5-10%											
55.0	61.4	Bioturbated Calc-Lutite:		113175	55	56	1	6	360	1350	2	880	15
		Grey with black slightly dolomitic		113176	56	57	1	6	360	1350	2	1300	15
		and arenaceous bioturbations.		113177	57	58	1	8	230	650	2	1000	20
		35-60% core recovery.		113178	58	60	2	4	400	1000	2	1550	30
				113179	60	62	2	4	370	1500	2	1050	65
61.4	67.2	Bioclastic Calc-Lutite:											
		Abundant shell fragments in a											
		grey fine matrix. Minor calcite											
		and siderite veining at 10° to C.A.											
		Bedding 60° to C.A. @ 62.2 m											
		80-90% core recoveries											

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
67.2	78.2	Bioturbated Calc-Lutite to Calc-Arenite: Probable wormburrows, minor bioclastic calc-lutite to calc-arenite. Minor calcite-siderite veining	Trace sphalerite @ 76.5 m					
78.2	82.0	Interbedded Calc-Lutite and Dol-Lutite Grey calc-lutite, variably bioclastic and bioturbated with black moderately fossiliferous argillaceous dol-lutite. Minor oolitic to calc-arenite beds. Minor calcite-siderite veining @ 10° to C.A.						
82.0	85.4	Calc-Arenite: Brown-grey, variably bioclastic. Minor black argillaceous dol-lutite bands. Moderately stylolitic. Moderate calcite and minor siderite veins. Bedding - 50° to C.A. @ 83.8 m - 65° to C.A. @ 85.4 Cavity - 82.9-83.5 m	Trace pyrite in calcite veins					
85.4	97.9	Calc-Lutite: Grey variably bioclastic, slightly bioturbated Abundant thin black argillaceous dol-lutite bands. Minor calcite-siderite veining @ 10° to C.A.						
97.9	98.5	Calc-Arenite: Grey, minor stylolites, poorly bedded. Minor calcite-siderite veins Bedding 60° to C.A. @ 98.2 m						

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DRILLHOLE Nº DTM-84-1 Page 1 of 6 **drill log** metric

PROJECT	DUNDAS - TASMANIA Nº A84-109	**ELEVATION**		**COMMENCED**	8-5-1984	**HOLE SURVEY** Eastman Single Shot - BAD Pty Ltd											
PROSPECT	MARIPOSA	**DIP COLLAR**	-52° GE	**COMPLETED**	24-5-1984	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing			
CO-ORDINATES	58800 N 67248 E	**CORE SIZE**	HQ	**TOTAL LENGTH**	124.60m	40	-54°	059									
BEARING	090 G 061 M 072 T	**LOGGED BY**	P.A. JONES.	MACHINE USED: MINDRILL 10L BAD Pty Ltd.		80	-54.5°	059									
						120	-55°	058									

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
		TERTIARY						
0.00	3.00	Fluvioglacial Gravels.						
		Fluvioglacial gravels overlain by humic layer						
		ORDOVICIAN - GORDON LIMESTONE.	Trace pyrite					
3.00	10.10	Interbedded Foliated Calc-lutite / Dol-lutite / Calc-arenite: Heavily stylolitized, fresh, foliated (cleavage?) grey massive calc-lutites interbedded with black argillaceous, pyritic, fine dol-lutite and bioclastic calc-arenites. Minor calcite and siderite veining. Individual beds vary from laminae to 5cm in width. Cleavage 35° to c.a. @ 9.50m. Core badly broken along foliation plane.						
10.10	25.70	Rhythmically Interbedded Calc-lutites / Dol-lutites: Thinly interbedded (<2cm width) grey, massive to weakly laminae, unfossiliferous calc-lutites and black argillaceous dol-lutites. Bedding contacts heavily stylolitized (slickensided occasionally). Core shows signs of soft sediment deformation? or worm burrowing (pelletal development). Core cut by minor calcite-siderite veins. Major vein and tectonic breccia @ 17.0 - 18.4m. Minor zone of leaching @ 19.6 - 19.9m. Bedding @ 14.4m - 40° to c.a.						
25.70	26.55	Bioclastic Calc-arenite / Dol-arenite: Very speckled interbedded sequence (fining downhole) of grey bioclastic calc-arenites	Trace sphalerite - pale pink.					

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DRILLHOLE Nº DTM-84-1 Page 2 of 6 **drill log** metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
25.70	26.55	CON'T : (minor zones filled by sparite) and speckled bioclastic dol-arenites. Trace pink fine grained disseminated sphalerite.						
26.55	27.95	Crudely Laminar Interbedded Calclutite / Argillaceous Dol-lutite: Grey massive to weakly speckled (birds-eye) calc-lutite, minor calcarenite thinly interbedded (< 1cm) with black argillaceous laminar dol-lutites. Sections of core almost entirely comprised of limestone with very thin dol-lutite laminae present. Core weakly calcite veined, trace siderite. Bedding 45° to ca @ 26.75 metres						
27.95	28.35	Matrix Support Slump Breccia: Sequence of large and small intraclastic fragments of limestone (varying colours) and dol-lutite with minor pyrite aggregates (later event!) set in a fine dark grey to black matrix - Dol-lutite. Breccia cut by siderite veinlet with associated minor dolomitization of vein FW and HW contacts. Sections of breccia show sinuous tubes? filled by sparry calcite. Minor siderite as cement to sections of breccia.						
28.35	29.90	Laminar Calc-lutite / minor Dol-lutite: Predominantly weakly birds-eyed, crudely laminar to massive (progressively down-hole) weakly bioclastic calclutites with minor laminae of argillaceous black dol-lutites becoming less prevalent downhole. Bedding contacts heavily stylolitized and disjointed due to microfaulting and slippage (foliation?).						

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METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
29.90	43.60	Interbedded Sandy Calc-lutite / Calcareous Quartz Sandstone / Argillaceous Dol-lutite: Sequence of soft sediment deformed decreasing to well bedded and undeformed downhole. The early part of the sequence is dominated by a speckled calcareous sandstone interbedded with weakly sandy grey calc-lutites and pyritic dark grey argillaceous dol-lutite. Calcareous sandstone is occasionally very pyritic (up to 7%) with traces of disseminated galena also. Section of core from 35.00 to 36.50 shows slumping structures? nodular development or bioturbation features. Tectonic breccia @ 35.60-35.90. - calcite/minor siderite as matrix, weakly dolomitized. Vein @ 37.5 - 38.0 m calcite matrix, minor siderite. Core in sequence only weakly calcite veined. Bedding 44° to ca @ 41.5 m. Sequence from approx. 39.6 m rhythmically interbedded calclutites minor calcareous sandstone, sandy calclutites all generally <7cm in width and argillaceous dolutite (generally <1½ cm in width)	Pyrite disseminated in calcareous sandstone with trace disseminated galena.					
43.60	50.50	Foliated Laminar Calc-lutite / Dol-lutite: Laminations vary from mm's to thin beds generally <0.5 cm in width. Upper section showing possible bioturbation textures. Unit is predominantly free of quartz clastic detritus. Individual dol-lutite units are cut at right angles by calcite filled tensional features? which do not continue into the calc-lutite interbeds. Two 5cm wide calcite, minor siderite veins present - in general, little veining. Minor beds of bioclastic calcarenites. Bedding 30° to ca @ 47.75 m.						

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DRILLHOLE Nº DTM-84-1 Page 4 of 6 **drill log** metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
50.50	57.70	Laminar Interbedded Calcareous Quartz Sandstone / Calclutite / Dol-lutite: An interbedded sequence of speckled calcareous quartz sandstone, grey massive calc-lutites and black to dark grey argillaceous dol-lutite. Dol-lutite laminae are generally <2mm in width and most bedding contacts are heavily stylolitized. Sections of core show signs of soft sediment deformation. Breccia, siderite / calcite filled and containing minor aggregates of pyrite from 50.60 - 51.1 m. Good bedding @ 56.95 with 37° to ca being the average.	Minor bedded fine grained pyrite. Pyrite aggregates in siderite/calcite filled vein breccia.										
57.70	77.40	Bioturbated Limestone / Calcareous Quartz Sandstone: Bioturbated calc-lutite and speckled calcareous quartz sandstone. Bedding contacts heavily stylolitized. Weak calcite veining. Pyritic (5-7%) calcite siderite vein @ 60.2. Weakly laminar to massive calclutite with minor dol-lutite between 59.4 - 60.2 m. Weakly nodular or bioturbated more massive calclutite with approx. 10% calcareous sandstone and minor dolomite to 63.5 m. Bioturbated and nodular limestone and calcareous medium grained quartz sandstone from 63.5 - 77.4 with silicification and sideritization from 64.2 to 64.8 m with minor pervasive dolomitization and pyritization. Cavity from 64.8 - 68.1 m. Further interbedded Bioturbated limestones and calcareous sandstones from 68.10 to 77.40 cut by numerous calcite and siderite veins. Possibly 2 generations of calcite veining; one cuts siderite / calcite set. Tectonic	Trace galena in siderite vein 60.2	103826	59	60	1	10	32	38	<1	310	40
				103827	60	61	1	16	260	210	<1	1000	35
			Trace galena in dolomitized rocks from 64.2 - 64.8m	103828	61	62	1	18	100	80	<1	270	30

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
57.70	77.40	CON'T: breccia @ 76.10 to 76.60m. Birds eyed calclutite (sparite filled ovoids) occurring at 74.8 m interbedded (soft sediment deformed contacts) with argillaceous dol-lutite. Bedding 47° to c.a @ 74.8 metres.											
77.40	77.75	Weakly Laminar MW Limestone: light grey, moderately weathered, leached, weakly laminar, weakly stylolitized, calclutite with minor dol-lutite laminae.											
77.75	89.50	MW to HW Calcite / Siderite Veined, Slumpy Textured Calc-lutites and Dol-lutites: Core extensively broken, poor recoveries ≈ 50%, in badly leached moderately to highly weathered extensively calcite siderite veined (minor pyrite and pink sphalerite) soft sediment deformed calc-lutites, bioclastic calc-arenites and argillaceous dol-lutites. Also weakly silicified variants of the above occur. Vein attitude ≈ 42° to ca @ 83.05 metre.	Minor to trace pink sphalerite in siderite vein @ 83.05 m. Minor pyrite assoc. with siderite veins throughout sequence.	103794	78	79	1	80	65	165	1	2100	50
				103795	79	80	1	14	390	490	2	3000	75
				103796	80	83	3	38	2300	6500	10	1.10%	220
				103797	83	84	1	26	480	5600	3	1.30%	120
				103798	84	85	1	16	220	230	2	860	140
				103799	85	86	1	46	790	1000	4	540	160
				103800	86	87	1	34	200	680	2	4000	155
				103801	87	89	2	30	170	320	2	1400	85
89.50	101.55	HW to CW Limestone, minor Dolomite: Predominantly light and dark calcareous clays containing minor zones of highly weathered rock identified as foliated nodular limestone and argillaceous dolomite with minor zones (93.4-93.7) of highly silicified limestone ?? Minor zones of highly weathered calcite / siderite containing minor disseminated pyrite. Core very badly broken with few lengths exceeding 10cm in length. Core recoveries approx. 50-75%.	Trace disseminated pyrite in calcite veins.	103802	89	90	1	18	1500	1000	3	880	180
				103803	90	91	1	12	800	700	2	1100	45
				103804	91	92	1	18	60	230	1	2050	55
				103805	92	93	1	14	70	285	41	690	60
				103806	93	94	1	16	32	75	1	7300	85
				103807	94	95	1	12	46	340	2	2300	70
				103808	95	96	1	16	85	650	2	3550	80
				103809	96	97	1	8	22	160	1	940	50
				103810	97	98	1	12	310	1300	5	1600	75
				103811	98	99	1	8	20	180	3	2850	65
				103812	99	100	1	12	40	340	1	1550	85
				103813	100	101	1	22	460	2550	4	900	135

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
101.55	102.95	Ironstone Breccia:		103814	101	102	1	18	290	2650	3	8000	110
		Small angular clasts of limestone silicified and dolomitized and quartz grains set in an ochre brown silicified ferruginous matrix. Minor relict laminations present (preserved bedding?) No observable sulphides.		103815	102	103	1	38	910	3300	7	4500	70
102.95	106.40	CW Limestone:		103816	103	104	1	10	85	630	2	880	50
		Completely weathered dark grey calcareous clays with minor relict highly weathered sections of calc-lutite and argillaceous dol-lutite.		103817	104	105	1	8	28	240	2	700	65
				103818	105	106	1	8	22	210	<1	1500	35
106.40	111.75	Calcareous Quartz Sandstone:		103819	106	107	1	10	44	300	2	4400	30
		Massive to weakly laminar, light grey, highly weathered, calcareous, quartz, coarse grained sandstone fining downhole into a fine grained sandstone/siltstone.		103820	107	108	1	8	26	180	2	8400	45
				103821	108	110	2	12	250	830	2	850	45
				103822	110	112	2	18	160	2800	4	720	90
111.75	112.80	Silicified Soft Sediment Deformed Limestone / Dolomite:		103823	112	113	1	14	150	1250	8	1.95%	210
		Foliated textured, soft sediment deformed thinly bedded and weakly laminar, silicified, limestones and dolomites.											
112.80	119.00	FAULT ZONE:		103824	113	114	1	220	4000	3400	1	1300	310
		Light grey and orange fughy clay with minor fragments of country rock, ironstone and quartz pebbles.		103825	114	115	1	6	3100	1000	<1	600	310
		CAMBRIAN - DUNDAS FORMATION.											
113.20	124.60	Interbedded Siltstones / Shales.											
		Interbedded highly weathered yellow beige siltstones and shales with minor quartz veining. Bedding 25° to ca @ 123.80 metres.											
		END OF HOLE 124.60 metres.											

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DRILLHOLE Nº DTM - 84 - 2 **Page** 1 of 7 **drill log** metric

PROJECT	DUNDAS - TASMANIA NºA84-109	**ELEVATION**		**COMMENCED** 31-5-1984	BORE HOLE SURVEY		Eastman Single Shot - BAD Pty Ltd.									
PROSPECT	MARIPOSA	**DIP COLLAR**	- 60 GE	**COMPLETED** 18-6-1984	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing			
CO-ORDINATES	58950 N 66999 E	**CORE SIZE**	HQ	**TOTAL LENGTH** 186 m.	50	-66°	059°	186	-68.5°	059°						
BEARING	090 G 061 M 072 T	**LOGGED BY**	P.A. JONES.	MACHINE USED: MINORIL 10L BAD Pty Ltd.	100	-66°	057.5°									
					150	-67°	057.°									

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
		SILURIAN / ORDOVICIAN - CONTACT											
0.00	55.70	cut using a roller bit.											
		GORDON LIMESTONE.											
55.70	58.80	Silicified, Dolomitized Carbonate: Massive to weakly laminar, dark grey argillaceous? weakly silicified dolomitized carbonate. Minor siderite/quartz veins (av. < 0.3mm) Trace red brown sphalerite as large aggregates.	Trace sphalerite as large aggregates.										
58.80	63.50	Slumped, Silicified, Dolomitized Carbonate: Badly broken zone of weakly slump brecciated?, silicified and dolomitized grey crystalline calc-lutites? within a more argillaceous, pyritic, dolomitic (primary) matrix. Core cut by numerous cream coloured siderite?/dolomite? veins and veinlets occasionally containing pink to red sphalerite as disseminations and streaks. Minor stylolitization around fragment boundaries. Boundaries are very ragged. Occasionally large laminated fragments present (up to 10cm in width).	Trace sphalerite disseminated & streaks (pink/red). Minor pyrite within dolomitic material.										
63.50	64.40	Bioclastic, Silicified, Dolomitized Carbonate: Light grey, bioclastic (shelly) textured (cream coloured cusp like fragments and ovoid fragments with ghosted boundaries) massive dolomitized calc-arenite? with minor calc-lutite? Core weakly silicified and extensively dolomitized and cut by minor quartz and siderite veins.											

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DRILLHOLE Nº DTM-84-2 **Page** 2 of 7

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
64.40	73.75	Dolomitized Carbonate: Dark grey massive to weakly bedded pyritic dolomitized and silicified calc-lutites? and bioclastic (shelly) silicified and heavily dolomitized calc-arenites? Core weakly broken - generally parting on fracture or vein surfaces. Numerous internal and localized (one side of core only) breccias - dolomitization crackle breccias healed by coarse dolomite. Minor quartz veining - occasionally containing large clots and aggregates of yellow-red sphalerite. Bedding 35° to c.a. @ 64.7m.	Trace sphalerite as clots and aggregates within breccias and veins.	103997	65	68	3	8	330	2500	<1	490	55
				103998	68	71	3	10	220	3400	1	410	55
				103999	71	74	3	12	990	2300	1	720	40
				104000	74	77	3	8	800	1300	1	840	30
73.75	77.60	Dolomitized Pisolitic Carbonate: Massive sequence of spherical and ovoid pisolites and ovalites varying in size from .2 to 1.5 cm set in a matrix of white-cream (non calcareous) dolomite? Some finer grained pisolites set in a more micritic grey matrix. Sections of core crackle brecciated (dolomitized) with minor open spaces partly filled by dolomite. Zone is weakly silicified, minor quartz veinlets. Fracture surfaces invariably contain smeared out gn, sl (pink) mineralization. Minor gn/sl/py mineralization as coarse grained aggregates with dolomitized crackle breccias.	Smeared galena/sphalerite/pyrite on fracture surfaces. Blebby galena/sphalerite in dolomite healed crackle breccia zones.										
77.60	100.50	Mineralized, Veined, Silicified, Dolomitized Carbonate: Sequence heavily dolomitized and weakly silicified masking original textures and leaving ghosted outlines. Zone massive to weakly laminar, extensively veined (siderite-dolomite, minor quartz with minor sphalerite (yellow) and galena) and weakly	Minor gn/sl/py as veins, aggregates within veins and as smears on fracture surfaces.	102839	77	80	3	8	190	540	2	670	20
				102840	80	83	3	12	2900	4700	5	1050	50
				102841	83	86	3	8	480	280	1	970	30
				102842	86	89	3	8	2700	2000	2	1500	50
				102843	89	92	3	8	2100	670	2	1550	55
				102844	92	95	3	10	740	1700	2	1400	95

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METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
77.60	100.50	CONT: crackle brecciated calc-lutites and micrites. Minor siderite vein containing 3% Gn-Sl-Py @ 88.35 to 88.50m. Further mineralization occurs as smears on fracture surfaces. Cavity from 94.70 to 95.00m. Zone from 95.00 to 100.50m becoming limonite stained and weakly weathered (unit ends silicified and dolomitized zone) with minor manganese dendrites on fracture surfaces.						
100.50	121.00	Interbedded Calc-lutite, Calc-arenite, Dol-lutite: Soft sediment deformed, massive grey calc-lutites interbedded with bioclastic (shelly) calc-arenites and dark grey to black argillaceous, weakly pyritic dol-lutite. Heavily stylolitized bedding contacts show ragged texture and minor brecciation (break up of sediment bed). Core quite competent with minor breakage to fracture and vein surfaces. Core weakly to moderately calcite, minor siderite veined with trace yellow-green sphalerite and galena. Veins at high angle to bedding. Bedding 34° to ca @ 101.8m; 26° to ea. @ 118.0m.	Trace sl, gn in veins.					
121.00	122.40	Dolomitized Matrix Support Breccia: Angular and ragged, small and large fragments of limestone, dolomite, sparry calcite etc set within a coarsely crystalline pervasively dolomitized argillaceous dolomite matrix. Unit cut by heavy calcite and greeny-grey clay mineral. Minor pyrite.	Minor pyrite.					

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DRILLHOLE Nº DTM-84-2 **Page** 4 of 7

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
122.40	128.50	Veined, Brecciated, Slumpy Limestone/ Dolomite: A sequence of calcite trace siderite veined and brecciated massive grey calc-lutites, bioclastic calc-arenites and argillaceous, carbonaceous dol-lutite. Minor clay zone with some coarsely crystalline quartz and calcite @ 124.3 - 124.8 m with trace brown sphalerite.	Trace brown Sl @ 124.8 m with coarsely crystalline calcite.										
128.50	131.80	Slumpy Calclutite, Dol-lutite: Ragged fragments and slumpy interbeds of grey massive calc-lutites, bioclastic calc-arenites and thinly interbedded argillaceous dol-lutites. Unit becomes progressively more slump brecciated downhole. Core cut by minor calcite veining.											
131.80	144.60	Lead-Zinc Siderite, Calcite, Pyrite, Barite Mineralization: 131.80 - 135.80m - Semi massive cream yellow siderite with minor calcite containing semi-massive to disseminated galena and pale yellow to pink sphalerite approx 3-5% Pb/Zn. Sphalerite is very fine grained, galena moderately coarse grained, very crystalline. Section weakly silicified and dolomitized. Zone also contains 3-5 % Py as fine grained disseminations. 135.80 - 136.80 Calcite minor siderite vein breccia? with both FW and HW contacts heavily fragmented and brecciated. Angular fragments are set in a beige brown silicified? clay matrix. Zone approx 1% Pb-Zn. 136.80 - 137.60 Massive cream yellow siderite with minor calcite found infilling voids and open spaces. Myriads of	131.80-135.80 3-5% Pb-Zn 135.80-136.80 1% Pb-Zn 136.80-137.60 4% Pb-Zn 137.60-140.60 1-2% Pb-Zn 140.60-144.60 1% Pb-Zn.	103829 103830 103831 103832 103833 103834 103835 103836 103837 103838 103839 103840 103841 103842	131 132 133 134 135 136 137 138 139 140 141 142 143 144	132 133 134 135 136 137 138 139 140 141 142 143 144 145	1 1 1 1 1 1 1 1 1 1 1 1 1 1	24 8 36 50 28 30 34 18 46 16 4 6 6 8	1.71% 1.65% 5.20% 8.25% 3.45% 1.26% 4.10% 5250 9.05% 1.94% 1.63% 2.20% 1.08% 7400%	3400 4400 6400 2.80% 1.75% 7200 1.20% 6100 7300 1.40% 3800 4300 2800 3800	13 36 152 76 60 40 50 11 215 18 13 20 17 15	2.00% 7.15% 8.60% 9.30% 9.70% 4.60% 9.75% 5.80% 6.10% 6.80% 7.90% 9.85% 9.25% 6.20%	145 280 70 1050 3050 220 90 1050 1.10% 3.75% 440 480 440 380

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DRILLHOLE Nº DTM-84-2 Page 5 of 7

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
131.80	144.60	CON'T : veinlets and dendrites filled by very fine grained galena and pale coloured sphalerite with minor pyrite set in a dark grey green argillaceous dolomite matrix. 137.60 - 140.60 Possibly veined matrix support breccia containing angular fragments of varying sizes (5cm and down) and varying lithologies (including those outside the mineralized sequence) set in a calcite cement. This has later been cut by cream siderite veins. Fragments of sideritic material as well as sulphides (gn, sl) incorporated in the breccia. Assays approx 1-2% Pb over unit. Galena both coarse and very fine grained. Sphalerite in general fine grained. 140.60 - 144.60 Semi massive siderite set within an argillaceous silicified dolomite matrix and later cut by further siderite veinlets creating stockwork texture. Minor pyrite occurs as aggregates and blebs. Galena, sphalerite is less abundant and generally found as discrete blebs or clusters and relatively coarse grained. Part of host is crackle brecciated dolomitized and silicified limestone?											
144.60	160.30	Bedded Calc-lutite, Dol-lutite : Sequence of rhythmically bedded, grey, massive in general unfossiliferous calc-lutites (5-10cm in width) and dark grey to black argillaceous dol-lutites (1-3 cm in width). Zone heavily crackle brecciated and veined from 144.60 - 151.00 m. with minor to moderate grade galena/sphalerite occurring with a calcite/siderite gangue 145.50 - 145.70 ≈ 2% Pb-Zn.	145.5-145.7 - 2% Pb-Zn	103843	145	146	1	8	1.37%	5100	26	2.00%	120
			149.0-149.05 - 6% "	103844	146	147	1	10	4150	1.00%	4	1.50%	170
			150.0-150.4 - 10% "	103845	147	148	1	4	870	1650	3	7200	150
				103846	148	149	1	6	880	2600	3	1.10%	135
				103847	149	150	1	48	2.15%	3.50%	49	3.30%	160
				103848	150	151	1	28	3.90%	7000	46	1.85%	155

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
144.60	160.30	CON'T: 149.00-149.05 ≈ 6% Pb-Zn. 150.00-150.40 ≈ 10% Pb-Zn as coarsely crystalline brown sphalerite and galena set within a calcite healed angular tectonic breccia! Bedding 35° to ca @ 154m, 15° to ca @ 158m. Calcite veins and veinlets sub parallel to bedding.											
160.30	175.40	Calc-lutite, Bioclastic Calc-arenite, Dol-lutite, Soft Sediment Deformed: Interbedded sequence of soft sediment deformed to almost slump brecciated grey massive calc-lutites, bioclastic (shelly) calc-arenites and argillaceous dol-lutites. Bedding contacts usually very ragged and heavily stylolitized. Dolomite units are generally <1cm in width. A zone of dolomitized black argillaceous micrite?? contains very fine grained yellow sphalerite as disseminations and aggregates with associated pyrite trending parallel to bedding foliation. A calcite matrixed tectonic? breccia occurs @ 169.0 to 171.0 metres containing minor to trace siderite and trace galena sphalerite. The vein? has a pyritic and galena-sphaleritic (white to pale pink) halo extending up to 0.75 m either side. The sphalerite occurs as fine to medium grained clusters and disseminations within a dark grey argillaceous micritic breccia? and the galena occurs as very coarsely crystalline aggregates. Bedding 30° to ca @ 167 metres.	171-172 = 1.5% Pb-Zn	103887	169	170	1	8	2550	1800	<1	1.35%	50
				103888	170	171	1	6	1000	1300	<1	1.35%	30
				103889	171	172	1	55	7900	3600	34	1.55%	7550
175.40	177.30	Bioclastic Calc-arenites Interbedded With Argillaceous Dol-lutite:											

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DRILLHOLE Nº DTM-84-2 Page 7 of 7

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
175.40	177.30	CON'T: Highly fossiliferous (shelly) bioclastic light grey calc-arenite with minor calc-lutite interbedded with very thin < 1.0 cm width argillaceous dol-lutite. Bedding contacts heavily stylolitized and show soft sediment deformation.						
177.30	186.00	Rhythmically Interbedded Calc-lutite, Dol-lutite: A sequence of rhythmically interbedded massive grey calc-lutites (unfossiliferous) averaging from 5-10 cm in width and black argillaceous thinly bedded (<1cm in width) occasionally speckled dol-lutite. Core weakly calcite veined. Bedding 25° to ca @ 175m, 22° to ca @ 185.40m. Bedding contacts heavily stylolitized and ragged.						
		END OF HOLE 186.00 metres.						

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DRILLHOLE Nº DTM-84-3 **Page** 1 of 3 **drill log** metric

PROJECT	DUNDAS - TASMANIA	Nº A84-109	**ELEVATION**		**COMMENCED**	19-6-1984	BOSE HOLE SURVEY Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing
PROSPECT	MARIPOSA		**DIP COLLAR**	-40 GE	**COMPLETED**	23-6-1984	30	-43°	061°						
CO-ORDINATES	58825	N 67288 E	**CORE SIZE**	HQ	**TOTAL LENGTH**	70m.	70	-45°	058°						
BEARING	090	G 061 M 072 T	**LOGGED BY**	P.A. JONES	MACHINE USED: MINDRILL 10L BAD Pty Ltd.										

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
		TERTIARY.						
0.00	2.20	Fluvioglacial sand and Gravel Fluvioglacial sands and gravels overlain by humic sands and peat.						
		ORDOVICIAN - GORDON LIMESTONE.						
2.20	14.20	Foliated Bioturbated calc-lutite/Dolomite/minor calc-arenite: Sequence of heavily foliated, bioturbated, (nodular textured) and stylolitized weakly calcite veined grey massive calclutites, argillaceous dark grey to black dol-lutites and minor bioclastic (gastropod fragments) calc-arenites. Bedding contacts are ragged and jagged and heavily slickensided (some beds truncated-faulted). Minor yellow sphalerite in calcite augen at 2.5 m. Foliation 45° to ca @ 7.10 m. Zone of calcite/siderite healed tectonic angular breccias from 9.90 to 11.5 m. Core extensively dolomitized (coarsely crystalline) with minor pyrite. Possible bedding 71° to ca @ 14.20 metres.	Trace sphalerite in calcite filled augen. Trace pyrite in siderite/calcite veins.					
14.20	18.20	Dolomitized, Veined, Slumpy Carbonate: Coarsely crystalline cream dolomite is found pervasively throughout the unit associated with extensive siderite/calcite minor pyrite veining of slump textured grey calclutites and dark grey argillaceous very fine grained dol-lutite. Thin carbonaceous filled stylolitites are found between ragged boundaries between calclutites and dol-lutites.	Trace pyrite in calcite/siderite veins.					

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Amoco Minerals Australia Company

DRILLHOLE Nº DTM-84-3 **Page** 2 of 3 **drill log** metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
18.20	19.60	Slumpy Textured Calc-lutite, Dol-lutite: Very slumpy textured (almost brecciated) with ragged boundaries and moderately stylolitized grey calclutite and dark grey argillaceous dol-lutite. Minor thin zones of shelly bioclastic calc-arenites.											
19.60	20.80	Weakly Laminar Calc-lutite: Light grey, welly-weakly laminar moderately weathered and leached calc-lutite containing thin dark grey dol-lutite lamellae. Core quite pyritic mainly within dark lamellae. Bedding 50° to ca @ 20.40m.	Minor py within dark dolomite lamellae, finely disseminated.										
20.80	32.50	Dolomitized, Weakly Pb-Zn Mineralized Veined Breccia: Coarsely crystalline cream dolomite occurs pervasively throughout the mineralized zone along with minor silicification? of an otherwise calcite / siderite veined and brecciated primary black dol-lutite and micrite. Sphalerite occurs as fine grained disseminations to large clusters or aggregates along with coarsely crystalline galena. Pyrite occurs as fine disseminations throughout dolomitized sequence. Minor clay zone with HW calclutite / Dol-lutite lithologies from 25.50 – 28.00 metres.		103850	21	22	1	16	1.62%	3700	57	2.05	180
				103851	22	23	1	16	1650	1850	17	1.22	190
				103852	23	24	1	470	1050	610	35	7700	25
				103853	24	25	1	26	50	160	1	4600	20
				103854	25	26	1	34	125	280	1	2400	50
				103855	26	27	1	28	920	2400	5	2600	125
				103856	27	28	1	10	600	2200	3	6100	220
				103857	28	29	1	20	490	1.55%	3	1.50%	250
				103858	29	30	1	32	2200	2400	5	2.33%	25
				103859	30	31	1	20	3900	1.90%	8	1.55%	80
				103860	31	32	1	10	210	6700	1	3100	40
				103861	32	33	1	10	180	1250	1	1800	100
32.50	44.80	Calc-lutite: Sequence of grey to light grey silty clays containing minor fragments of argillaceous laminar completely weathered to highly weathered very calcareous calc-lutites. Minor white patches due to HW calcite patches or veins. Poor recovery ≈ 40%.		103862	33	34	1	14	120	510	<1	1850	70
				103863	34	35	1	16	250	860	1	1650	220
				103864	35	36	1	24	600	2300	1	940	340
				103865	36	37	1	6	175	920	<1	970	130
				103866	37	38	1	8	30	220	<1	1650	105
				103867	38	39	1	16	460	5000	1	840	115
				103868	39	40	1	10	590	2200	1	800	100
				103869	40	41	1	6	140	640	<1	870	40

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DRILLHOLE Nº DTM-84-3 **Page** 3 of 3

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
44.80	58.00	CW- HW Calc-lutite (laminar?): Sequence of dark grey clays, argillaceous, minor calcite patches and veinlets with more numerous sections of HW argillaceous calcareous laminar calc-lutites. Bedding 52° to ca @ 47.9m. Core towards the base of the sequence becoming progressively silicified (uncalcareous) 55-58m. Poor recoveries approx 35%.		103870	41	42	1	12	140	1000	<1	1150	35
				103871	42	43	1	38	230	580	<1	1200	20
				103872	43	44	1	16	540	3800	<1	820	55
				103873	44	46	2	8	65	550	<1	3000	60
				103874	46	47	1	6	40	660	<1	6600	80
				103875	47	48	1	10	75	1350	<1	9500	95
				103876	48	49	1	8	9	165	<1	6200	90
				103877	49	50	1	6	34	460	<1	800	55
				103878	50	51	1	6	75	1000	<1	2700	65
				103879	51	52	1	8	34	1200	<1	1350	80
				103880	52	53	1	10	26	300	1	1350	45
58.00	65.80	Silicified, Dolomitized Sandstone: Coarse grained quartzose, weakly calc-carcous, limonite/argillite matrixed silicified and dolomitized sandstone. Siderite veinlets and veins contain minor galena and pyrite. Core very dense. Minor ironstone zone from 64.50-65.60 with partial clay matrix.	Minor gn+py in siderite veinlets. Ironstone from 64.50-65.60m.	103881	53	54	1	6	22	470	<1	1950	85
				103882	54	55	1	10	18	210	<1	3500	100
				103883	55	56	1	8	65	270	1	1350	90
				103884	56	57	1	18	100	1100	1	2500	70
				103885	57	58	1	22	145	2200	1	3400	85
				103886	58	59	1	12	50	240	1	2.35%	40
65.80	70.00	Fault Zone: Pale yellow to orange clays with minor highly weathered sections showing contorted relict bedding consistent with that incorporated in a fault zone. Minor 20cm wide section of dark grey silicified argillaceous medium grained sandstone from 69.00 to 69.20 metres. Clay zone contains abundant coarse quartz pebbles and jasper pebbles consistent with the Cambrian Dundas Formation.											
		END OF HOLE 70.00 metres											

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Amoco Minerals Australia Company

DRILLHOLE Nº DTM-84-4 **Page** 1 of 3

drill log
metric

PROJECT DUNDAS-TASMANIA Nº A84-109	**ELEVATION**		**COMMENCED** 24-6-1984	**BORE HOLE SURVEY** Eastman single shot - BAD Pty Ltd.										
				Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing		
PROSPECT MARIPOSA.	**DIP COLLAR** -40 GE		**COMPLETED** 29-6-1984	30	45.5°	060°								
CO-ORDINATES 59193 N 67310 E	**CORE SIZE** HQ		**TOTAL LENGTH** 77.3 m	77.3	46°	060°								
BEARING 090 G 061 M 072 T	**LOGGED BY** P.A. JONES		MACHINE USED: HINDRAL 10L BAD Pty Ltd											

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
		TERTIARY.											
0.00	2.30	Fluvioglacial Gravel: Fluvioglacial sands and gravels overlain by humic sands and peat.											
		ORDOVICIAN - GORDON LIMESTONE.											
2.30	8.65	Slumpy Calclutite / Dol-lutite: Weakly interbedded massive grey predominantly unfossiliferous calc-lutites with minor biodastic calcarenites and argillaceous dol-lutites. Sequence extensively soft sediment deformed and bioturbated (nodular texture). Core moderately to heavily stylolitized. Minor calcite/siderite veining - coarsely crystalline. There has been definite slippage along some of the deformed bedding contacts - cutting or displacing calcite veins. Bedding 60° to ca @ 2.90 m; 54° to ca @ 5.90 m.											
8.65	13.00	Speckled and Laminar Calc-lutite: Light grey massive to weakly laminar (lamellae being argillaceous and weakly pyritic dol-lutite) calc-lutites and minor speckled (due to open spaces being filled by sparrite - birds eyes) more massive calc-lutites. Core moderately stylolitized with carbonaceous infilling. Bedding 53° to ca @ 11.7 metres.	Trace pyrite with Dol-lutite lamellae										
13.00	26.50	CW Dolomite: Sequence of massive black and dark grey clays, uncalcareous and possibly representing a zone of argillaceous		103899	13	15	2	40	270	2400	2	28	85
				103900	15	16	1	50	370	4600	41	20	130
				103901	16	17	1	55	740	4100	1	8	180
				103902	17	18	1	85	830	3200	3	24	150
				103903	18	19	1	80	680	2800	2	32	240

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Amoco Minerals Australia Company

DRILLHOLE Nº DTM-84-4 Page 2 of 3

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION
13.00	26.50	CON'T: Completely weathered black dol-lutite.	
26.50	31.50	CAVITY.	
31.50	57.20	Dolomitized, Brecciated Siderite/Calcite Veined Limestones: Extremely poor recoveries were obtained through this section (av 20-25%). Material obtained showed dolomitized brecciated and veined (siderite-calcite) highly weathered argillaceous dolomites and grey massive limestones. Zones throughout sequence are comprised of light grey to dark grey clays containing minor fragments of vein rock or breccia fragments siderite healed with trace galena-sphalerite. Sections of rubbly core showed very polished slickensided surfaces indicative of movement.	
57.20	73.00	CW to HW Black Clays and Dolomitic Breccias: A sequence of massive fat black clays and clayey dolomitic quartz sands with minor sections of highly weathered Dol-lutite, Dolomite Breccias and Silicified argillaceous dol-lutites. A distinct dol-lutite slump Breccia occurs immediately below the above mineralized horizon. Silicification becomes progressively more prominent downhole (towards FAULT ZONE).	
73.00	73.30	FAULT ZONE: Grey quartz, clay filled, fragmental brecciated Fault Zone. Milky quartz fragments to 0.7mm in width.	

SAMPLE Nº	METERAGE From	To	Length	Cu	Pb	Zn	Ag	Mn	Ba
103904	19	20	1	48	1600	1850	3	24	250
103905	20	21	1	40	2100	2400	3	20	270
103906	21	22	1	32	2600	2500	4	8	310
103907	22	23	1	55	540	2200	3	16	220
103908	23	24	1	32	260	2000	2	18	150
103909	24	25	1	38	270	1900	1	20	260
103910	25	26	1	46	300	1150	2	50	200
103911	26	32	6	42	4400	1700	1	870	260
103912	32	33	1	18	580	730	<1	2050	85
103913	33	37	4	8	260	910	1	3000	95
103914	37	38	1	10	240	1600	1	8700	110
103915	38	39	1	6	44	480	<1	3400	80
103916	39	41	2	8	165	980	2	3050	75
103917	41	42	1	26	4000	6800	4	5.10%	65
103918	42	43	1	10	190	600	1	5200	70
103919	43	44	1	10	40	540	<1	1200	55
103920	44	45	1	14	250	2500	1	1.45%	40
103921	45	46	1	14	1300	5500	2	1.75%	80
103922	46	47	1	12	70	400	<1	1500	85
103923	47	48	1	12	120	570	<1	1600	80
103924	48	52	4	8	170	800	<1	1600	75
103925	52	53	1	16	70	390	<1	1700	45
103926	53	55	2	10	290	850	<1	3800	45
103927	55	56	1	12	100	840	<1	5600	80
103928	56	57	1	12	420	1100	<1	6400	110
103929	57	58	1	32	4700	1.50%	13	2.50%	80
103930	58	59	1	14	930	3100	5	5600	120
103931	59	60	1	8	70	540	<1	8000	150
103932	60	61	1	16	26	260	<1	5200	75
103933	61	62	1	14	95	1000	<1	7500	140
103934	62	63	1	14	250	1200	1	1200	70
103935	63	64	1	12	270	950	<1	6400	80
103890	64	65	1	22	600	1000	1	1450	200
103891	65	66	1	40	340	1250	1	44	290
103892	66	67	1	24	175	280	1	28	210
103893	67	68	1	46	410	1300	1	55	230
103894	68	69	1	44	570	1650	2	1450	250
103895	69	70	1	12	195	570	1	2.00%	135
103896	70	71	1	520	4.10%	2.45%	280	1800	470

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DRILLHOLE Nº DTM-84-4 Page 3 of 3

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
		CAMBRIAN - DUNDAS FORMATION.		103897	71	72	1	40	3950	820	4	60	430
73.30	77.30	Interbedded Siltstones and Shales:		103898	72	73	1	34	3000	4800	9	165	380
		Grey quartz veined / siderite veined siltstones and shales, highly cleaved and broken.											
		END OF HOLE 77.30 metres.											

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DRILLHOLE Nº DTM-84-5 **Page** 1 of 6 **drill log** metric

PROJECT DUNDAS - TASMANIA	Nº A84-109	**ELEVATION**		**COMMENCED** 2-7-1984	BORE HOLE SURVEY		Eastman Single Shot - BAD Pty Ltd.						
PROSPECT MARIPOSA		**DIP COLLAR**	-40 GN	**COMPLETED** 12-7-1984	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing
CO-ORDINATES 59200	N 67160 E	**CORE SIZE**	HQ, NQ	**TOTAL LENGTH** 145.7	50	43	—						
BEARING 270	G 241 M 252 T	**LOGGED BY**	P.A. JONES	MACHINE USED MINDRILL 10L BAD Pty Ltd.	100	45	236						
					145	46	236						

METERAGE From	To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	To	Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
		TERTIARY.											
0.00	2.50	Fluvioglacial Gravels											
		Fluvioglacial sands and gravels overlain by humic sands and peat.											
		ORDOVICIAN - GORDON LIMESTONE.											
2.50	8.60	CW Fossil Fragmental Breccia:		103936	2	4	2	5	30	250	x	5	14
		Orange / brown / grey coloured completely		103937	4	6	2	5	50	30	0.5	x	384
		to highly weathered mottled fossil		103938	6	8	2	15	30	35	1.0	x	368
		fragmental breccia. Fragments of shelly											
		detritus as well as corallite material.											
		Possible clasts of argillaceous dol-lutite											
		present. Rubbly material is non											
		calcareous possibly due to dolomitizat-											
		ion overprint?											
8.60	12.00	Cavity: (NO CORE RECOVERY).		103939	8	13	5	105	1400	765	4.5	x	319
12.00	22.90	Argillaceous, Pyritic, Bioclastic, Dol-lutite:	Lot of disseminated	103940	13	14	1	440	2950	1650	8.0	x	248
		Massive to moderately bioclastic (corallite	very fine pyrite ≈3%	103941	14	17	3	260	4450	3150	4.5	10	346
		fragments and other fine grained debris)	with large blebbs	103942	17	19	2	65	4650	2000	0.5	10	387
		black very pyritic highly weathered	also ≈ 1-2%	103943	19	20	1	65	4200	3000	x	15	341
		argillaceous dol-lutite. Core badly		103944	20	22	2	20	1600	4400	x	5	318
		broken with poor recoveries ≈ 50%		103945	22	23	1	55	1050	3050	0.5	5	229
22.90	31.10	Mineralized Matrix Support Breccia:	Appox 7% by as fine	103946	23	24	1	30	640	4000	1.5	10	164
		Massive sequence of completely weathered	grained matrix to	103947	24	25	1	25	465	2350	0.5	10	147
		black to dark grey pughy clays, with	breccia and as	103948	25	26	1	30	365	1750	1.0	10	153
		minor to moderate carbonaceous content,	fragments within	103949	26	27	1	45	615	1950	1.5	10	212
		very argillaceous and pyritic showing relict	breccia. Minor gal	103950	27	28	1	25	315	2400	1.0	10	130
		fragmental breccia textures with light grey	st fragments within	103951	28	29	1	25	295	1200	1.0	10	245
		and black ragged intraclasts along with	breccia also ≈ 1-2%	103952	29	30	1	30	415	1850	1.5	5	241
		pyrite / galena / sphalerite fragments set in	Pb-Zn.	103953	30	31	1	50	690	1800	1.0	5	247
		an argillaceous very pyritic (≈ 7%) dol-lutite?											

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DRILLHOLE Nº DTM-84-5 Page 2 of 6 drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
22.90	31.10	CON'T: matrix. Core doesn't fizz – due to dolomitization. Sections of core show little brecciation but more massive pyritic, argillaceous completely weathered dol-lutites. Fragments vary up to 25cm in width. Sections of breccia almost clast support, all fragments very angular.											
31.10	41.40	Pyritic (Brecciated) Argillaceous Dol-lutite: Sequence of highly to completely black brown and dark grey, brecciated? in part massive pyritic weakly bioclastic argillaceous dolomite. Core badly broken and crumbly, recoveries good approx 75-80%. Possible relict bedding in preserved dol-lutite approx 58% to ca @ 32.80 metres.	Fine grained py within dol-lutite.	103954	31	32	1	20	115	1950	0·5	5	248
				103955	32	33	1	20	165	2400	X	10	264
				103956	33	34	1	50	825	2450	1·5	10	258
				103957	34	35	1	30	240	2650	0·5	5	297
				103958	35	36	1	20	65	2050	1·0	15	346
				103959	36	37	1	15	140	2000	0·5	20	319
				103960	37	39	2	20	125	3250	0·5	10	273
				103961	39	40	1	15	65	2450	0·5	5	254
				103962	40	41	1	20	155	2750	1·0	20	285
41.40	55.10	Weakly Mineralized Pb-Zn Clays: Possibly completely weathered breccia – sulphide fragments in argillaceous dol-lutite / calc-lutite matrix, matrix material very high percentage of total rock. Visible but heavily oxidised galena occurs from 47.5 to 51.10m. Associated with minor HW to CW Siderite veinlets. Clay zone uncalcareous and highly argillaceous, possibly ddomitized.	Trace to minor Pb-Zn as fine grained oxidised gn/sl within breccia? and associated with Siderite veinlets. ≤ 1% Pb-Zn.	103963	41	42	1	20	60	1000	X	15	365
				103964	42	43	1	20	70	590	0·5	15	355
				103965	43	44	1	20	100	330	1·0	15	347
				103966	44	45	1	35	3850	1·40%	8·5	30	335
				103967	45	46	1	40	1·35%	1·55%	14·0	35	292
				103968	46	47	1	25	1800%	8150	7·0	5	303
				103969	47	48	1	20	250	2150	2·0	10	368
				103970	48	49	1	35	1·40%	1·50%	15·5	30	287
				103971	49	50	1	75	3·35%	2·75%	44·0	40	277
				103972	50	51	1	60	1·65%	2·50%	32·0	30	361
				103973	51	52	1	80	1·80%	1·40%	52·0	30	335
				103974	52	53	1	55	8000	2·30%	17·5	25	287
55.10	59.50	HW Pyritic Argillaceous Dol-lutite: Zone of badly broken highly weathered core; good recoveries (80-85%) consisting of black weakly pyritic argillaceous massive dol-lutite.	Trace fine grained disseminated py.	103975	53	54	1	25	1850	6100	8·5	10	321
				103976	54	55	1	20	255	1550	2·0	20	316
				103977	55	56	1	20	240	805	1·0	25	370
				103978	56	57	1	25	760	2050	3·5	15	413
				103979	57	58	1	20	500	1800	3·0	15	394
				103980	58	59	1	20	245	825	2·0	20	380
59.50	63.90	CW Carbonaceous Argillaceous Dol-lutite: Black completely weathered, carbon-	Trace pyrite.	103981	59	60	1	25	1750	5800	7·5	15	288
				103982	60	61	1	25	905	4600	3·5	15	256
				103983	61	63	2	25	95	990	0·5	20	377

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Amoco Minerals Australia Company

DRILLHOLE Nº DTH-84-5 Page 3 of 6 drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba.
59.50	63.90	CON'T: -aceous and argillaceous massive untextured, weakly pyritic (clays) dol-lutites.											
63.90	69.80	Bioclastic Pyritic Argillaceous Dol-lutite, Calc-lutite: A sequence of highly to moderately weathered black pyritic (including fine disseminations, blebs and possible pyrite angular fragments) massive to weakly bedded bioclastic (shelly and corallinè debris) argillaceous Dol-lutite and thinly bedded grey bioclastic, bioturbated ? calc-lutites and minor bioclastic calc-arenites. Limestone members appears to be preferentially weathered compared to dolomite.	Disseminated and blebby pyrite, locally up to 5%.										
69.80	75.50	Interbedded Dol-lutite / Calc-lutite, Massive black argillaceous dol-lutites predominate over light grey weakly bioturbated and weakly soft sediment deformed, calcite veined calc-lutites containing minor avoid to rounded corallinè debris up to 3-4mm in diameter. Core quite fresh, very good recoveries. Minor tectonic breccias, calcite healed. Bedding 45° to ca @ 72.75m.		103984	72	73	1	22	75	165	<1	610	210
				103985	73	74	1	22	100	220	<1	640	170
				103986	74	75	1	20	100	270	<1	930	130
75.50	79.40	Matrix Support Slump Breccia: Large fragments of corallinè material and angular limestone and dolomite intraclasts set in an argillaceous pyritic dolomite matrix. Core cut by minor calcite veinlets. A calcite - siderite (weakly py, gn, sl approx 1% Pb-Zn mineralized) vein breccia from 78.10 - 78.50 metres. Incorporated in the breccia is a 10cm wide clast of	78.10 - 78.50 ≈ 1% Pb/Zn gn, sl in siderit/ calcite vein breccia.	103987	75	76	1	20	340	1500	<1	1500	110
				103988	76	77	1	22	270	700	2	2100	120
				103989	77	78	1	20	650	1800	2	3700	135
				103990	78	79	1	32	2200	2900	7	2.0%	90

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Amoco Minerals Australia Company

DRILLHOLE Nº DTM-84-5 Page 4 of 6

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
75.50	79.40	CON'T: laminar, very pyritic, calclutite, dol-lutite containing very fine grained gn, sl (cream-yellow) mineralization as laminations and fine grained disseminations. Ragged fragment contacts are moderately to heavily stylolitized (carbonaceous infilled). Matrix of breccia appears dolomitized, coarsely crystalline in part.											
79.40	80.05	Laminar Calc-lutite, Dol-lutite: Dolomitized, (coarsely crystalline) light grey calc-lutite and calc-arenites with interbedded lamellae of dark grey coarsely crystalline argillaceous pyritic dol-~~lutite~~ arenite (weak fine grained disseminated galena present). Minor fine grained cream coloured sphalerite disseminated throughout. Bedding 47° to ca @ 80.0 metres. Unit very laminar.	Trace gn, sl in laminar calclutite/ Dol-arenite.	103991	79	80	1	20	660	1900	5	8500	220
80.05	85.35	Chaotic Clast-Matrix Support Breccia: Corallite, shelly, stromatoporoid fragments and intraclasts of limestone and dolomite (both angular and ragged) set in a dolomitized argillaceous, very pyritic dolomite matrix. Unit has been dolomitized as evidenced by coarsely crystalline cream white texture of matrix and fragments.	Abundant very fine grained py within dolomite host ≈ 3-5%.	103992	80	81	1	20	360	980	3	3450	155
				103993	81	82	1	16	36	75	41	430	190
				103994	82	83	1	18	110	590	1	840	115
				103995	83	84	1	26	48	170	41	360	115
				103996	84	85	1	20	60	200	1	720	75
85.35	89.60	Weakly Laminar, Pyritic, Dol-lutite: Sequence of weakly to moderately laminar very pyritic (bedded and disseminated) argillaceous and weakly dolomitized black to dark grey dolomite. Bedding 29° to ca @ 86.3m, 22° to ca @ 88.3 metres.	Abundant pyrite ≈ 3%.										

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DRILLHOLE Nº DTM-84-5 Page 5 of 6

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
89.60	106.00	Soft Sediment Deformed Interbedded Calc-lutite, Dol-lutite:	Trace disseminated pyrite					
HQ → NQ @ 90.0 m.		Unit more slumpy than soft sediment deformed for first 5 metres and contains minor corallinic debris. Unit progressively interbedded sequence of soft sediment deformed thinly bedded massive calc-lutite, bioclastic calc-arenite and black argillaceous weakly pyritic dol-lutite. Bedding contacts strongly stylolitized and sections of core weakly dolomitized and recrystalized. Core moderately calcite / trace siderite veined. Bedding 53° to ca @ 103.35 m.						
106.00	112.50	Interbedded Calclutite / Dol-lutite: Weakly foliated to massive grey calc-lutites (2-3 cm in width) interbedded rhythmically with black argillaceous dol-lutite (< 1.5 cm width). Bedding 57° to ca @ 111 metres.						
112.50	117.65	Interbedded Bioclastic Calc-arenite / Dol-lutite: Thinly interbedded bioclastic (coral fragments oolites, bisolites, and skeletal debris) calc-arenites (light grey, speckled texture) and black argillaceous dol-lutite. Sequence from 115 to 117.65 is badly broken and moderately weathered (recoveries ≤ 60%) and is comprised of brecciated (tectonically) and calcite / siderite veined and weakly dolomitized.						
117.65	119.30	Interbedded Calc-lutite / Dol-lutite: Massive grey calc-lutites (5-10 cm width) rhythmically interbedded with black argillaceous dol-lutites (< 2 cm in width).						

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DRILLHOLE Nº DTM-84-5 Page 6 of 6

drill log
metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
119.30	145.70	Soft Sediment Deformed Calc-lutite / Calc-arenite / minor Dol-lutite: Interbedded sequence of predominantly massive grey calc-lutites, minor bioclastic calc-arenites and black argillaceous dol-lutite (< 0.5 cm width). Beds weakly soft sediment deformed and extensively calcite/trace siderite veined. Veining has associated dolomitization. Major calcite/siderite/pyrite healed vein breccia from 138.40 - 139.90 · with trace to minor gn, sl. Major cave zone from 140 - 144.70 m with minor intermittent recoveries. Overall sequence moderately stylolitized Bedding 50° to ca @ 126.3 m, 50° to ca @ 136.00 metres.	Trace gn sl disseminated in vein from 138.40 - 139.9 m.					
		END OF HOLE 145.70 metres.						

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Amoco Minerals Australia Company

DRILLHOLE Nº DTM-84-6 Page 1 of 6 **drill log** metric

PROJECT DUNDAS TAS.	Nº A84-109	**ELEVATION**		**COMMENCED** 10/8/84	BORE HOLE SURVEY Eastman Single Shot B.A.D. Pty Ltd													
PROSPECT MARIPOSA		**DIP COLLAR** -45°		**COMPLETED** 23/8/84	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing					
CO-ORDINATES 59075 N 67170 E		**CORE SIZE** HQ		**TOTAL LENGTH** 238 m	50m	-46°	234°m	200m	-40°	233°m								
BEARING 270 G 241° M 252° T		**LOGGED BY** G. Kary		Machine Used HYDRILL F53 B.A.D. Pty Ltd	100m	-44°	234°	237m	-40.5°	233°								
					150m	-42°	234°											

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS						
0	1.5	HW Roller												
		ORDOVICIAN - GORDON LIMESTONE												
1.5	3.6	Oolitic Calc Arenite: Grey matrix of oolitites, moderately bedded with interstitial sparry calcite. Minor stylolites. Minor calcite veining with trace of siderite Bedding 40° to C.A. @ 2.8m	Trace of galena and pyrite in a calcite-siderite vein at 2.7m											
3.6	9.2	Dol-Lutite to Dol-Arenite laminations within Micrite: Grey dol-lutite to dol-arenite a fine laminations in a micrite. Abundant calcite eyes in micrite. Minor carbonaceous stringers separating dolomitic and micrite horizons. Bedding 40° to C.A. 8.7-8.9m - Fossiliferous to pesolitic horizon	Minor pyrite and sphalerite along carbonaceous stringers at 6.3m											
9.2	19.4	Calc-Lutite to Calc-Arenite: Dark grey calc-lutite to calc-arenite, slightly fossiliferous cut by lattice of grey finely crystalline dolomite. Boundaries between dolomite and calc-lutite often defined by carbonaceous stringers. Minor calcite veining @ 20° to C.A. at 90° to bedding.	Minor galena and sphalerite in veins @ 11.5m 14.3m, 15.0m 18.6m and 19.3m											
19.4	24.8	Interbedded Calc-Arenite and Dol-Lutite: Grey calc-arenite, variably fossiliferous	Trace sphalerite with fossiliferous horizons at 23.3m											

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Amoco Minerals Australia Company

DRILLHOLE Nº DTM-84-6 Page 2 of 6 drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
19.4	24.8	Minor pods of sparry calcite; with grey dol-lutite						
cont								
24.8	25.1	Limestone: Grey coarsely crystalline, abundant sparry calcite vugs						
25.1	27.5	Interbedded Dol-Lutite and Calc-Lutite Grey dol-lutite with brown-grey micritic calc-lutite. Abundant carbonaceous stringers, especially near contacts	Trace pyrite through-out					
27.5	28.0	Bioclastic Dol-Lutite: Black, vuggy weathering. 20% core recovery						
28.0	29.0	Bioclastic Calc-Lutite: Grey, coral and shell bioclasts. Possible stromatoporoids. Possible rip-up textures						
29.0	34.7	Fossiliferous Interbedded Dol-Lutite and Calc-Lutite: Dark grey dol-lutite and black micritic calc-lutite. Variably fossiliferous	Minor pyrite lamina at 30.3m and 31.2m					
34.7	92.5	Fossiliferous Interbedded Calc-Lutite and Dol-Lutite: Dark grey calc-lutite, fossiliferous with black fossiliferous dol-lutite. Minor stylolites in calc-lutite. Very sharp contact at 92.5m	5% pyrite in dol-lutite at 92.4m					
42.5	46.5	Calc-Arenite: Grey, sand size fossil grains, minor limestone grains, abundant large well rounded micritic grains to						

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DRILLHOLE Nº DTM-84-6 Page 3 of 6 drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
42.5 cont.	46.5	intra clast. Set in a recrystallized matrix. Minor thick stylolites Large calcite vein at 45.6 - 45.7m and 44.8 - 45.1m.	Minor pyrite throughout					
46.5	47.0	Interbedded Dol-Lutite and Calc-Lutite: Dark grey dol-lutite with grey calc-lutite, minor calc-arenite fragments within calc-lutite.						
47.0	51.6	Calc-Arenite: Coarse calc-arenite to calc-rudite. Large variety of intraclasts. Very porous when weathered 47.2 - 50.3 - Cavity	Up to 2% pyrite at 51.5m.					
51.6	55.3	Interbedded to Interfingered Dol-Lutite and Calc-Lutite: Dark grey dol-lutite with grey calc-lutite very whispy contacts between them. 53.0m - large pisolite to oncolites with shell fragments forming nucleus.						
55.3	62.0	Fossiliferous Calc-Lutite: Grey micritic calc-lutite, abundant rounded fossils. Cut by a network of black finely crystalline dolomite						
62.0	69.9	Dol-Lutite: Dark grey, argillaceous, dol-lutite, minor thin beds of grey fossiliferous calc-lutite Cavity - 67.4 - 69.0 m						

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DRILLHOLE Nº DTM-84-6 Page 4 of 6

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
69.9	70.9	Fossiliferous Dol-Lutite: Dark grey, argillaceous, abundant calcareous fossil fragments and chips						
70.9	72.3	Laminated Dol-Lutite and Calc-Lutite: Finely laminated, minor calcite eyes Bedding 45° to C.A.						
72.3	78.8	Mottled Dol-Lutite and Calc-Lutite: Dark grey dol-lutite and grey calc-lutite, variable ratio of dol-lutite to calc-lutite						
78.8	80.2	Caucty:						
80.2	82.1	Laminated Dol-Lutite and Calc-Lutite: Moderately to well laminated, possible minor soft sediment deformation	Trace of fine disseminated pyrite					
82.1	93.6	Fossil Breccia: Calcareous fossil fragments in a dolomitic (dol-lutite) matrix. Sharp contact at 93.6m.						
93.6	96.3	Laminated Calc-Lutite and Dol-Lutite: Moderately to well laminated, increasing dol-lutite component towards 96.3m. Bedding ~40-45° to C.A.						
96.3	118.4	Fossiliferous Calc-Lutite: Grey to brown fine (almost micritic) fossiliferous calc-lutite. Minor pods and zones of finely crystalline dolomite. Minor calcite veins.	Minor fine pyrite disseminated throughout Trace sphalerite in veins at 101.0m and 105.8m					
118.4	144.9	Banded Calc-Lutite and Dol-Lutite Grey fossiliferous calc-lutite variably dolomitized to produce banded texture,						

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DRILLHOLE Nº DTM-84-6 Page 5 of 6 drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
118.4	144.9	Fossils remain calcareous within											
cont.		dol-lutite bands. Pink carbonate											
		vein material at 127.2m. Slight											
		increase in fossil size and content											
		towards 144.9.											
144.9	150.5	Calc-Lutite:											
		Dark grey, slightly fossiliferous, minor											
		dolomitization. Moderate calcite-											
		siderite veins at 45° to C.A. Veins											
		have an angle of 30-40° to apparent											
		bedding.											
150.5	157.9	Banded Calc-Lutite and Dol-Lutite:											
		- as 118.4-144.9m. Very sharp											
		contact at 157.9m											
157.9	166.5	Galena-Sphalerite - Barite - Siderite	5% galena -	113187	158	159	1	14	2.20%	4200	35	6.90	140
		- Dolomite-Calcite:	sphalerite throughout	113188	159	160	1	48	6.35%	6700	70	7.7	110
		Complex network of mineralized		113189	160	161	1	8	4300	1100	22	4.5	1.87%
		calcite - dolomite - and siderite veins		113190	161	162	1	6	1.14%	1900	25	10.0	160
		Any possible original "bedding" textures		113191	162	163	1	140	4.24%	3100	80	9.0	5600
		have been wiped out.		113192	163	164	1	20	2.74%	2900	37	9.4	1.12%
				113193	164	165	1	28	2.34%	8000	65	9.7	1700
166.5	170.6	Calc-Lutite:	Trace galena	113194	165	166	1	16	4.82%	5200	24	8.4	730
		Dark grey, minor pods of grey	and sphalerite	113195	166	167	1	6	7050	1900	5	2.4	400
		dol-lutite. Intense calcite and	along fine stringers										
		minor dolomite veining	and veinlets.										
170.6	175.3	Dolomitic Breccia:	Trace galena										
		Crystalline grey dolomite containing	and sphalerite										
		fragments of calcite veins. Moderate	along fractures										
		to intense dolomite veining. Trace											
		calcite and siderite veining											
175.3	189.3	Dolomitized Carbonate Unit:	Trace pyrite in										
		Grey crystalline, massive. Minor dolomite	fine dolomite										
		veining and coarse crystalline dolomite	veins.										

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Amoco Minerals Australia Company

DRILLHOLE Nº DTM-84-6 Page 6 of 6

drill log
metric unit

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
175.3 cont.	189.3	Lining small cavities and vugs. Minor brecciation associated with larger dolomite veins. Minor siderite veins.						
189.3	192.4	Pisolitic Dolomite: 7-10 mm grey pisolites in a dark grey dolomitic matrix. Dolomitization has ghosted many pisolites. Intense dolomite veining with minor siderite						
192.4	193.9	Dolomitized Carbonate Unit: as 175.3 - 189.3m. 193.7 - 193.9 - Dolomite, siderite vein with trace of pink carbonate mineral Brecciation evident within vein	Minor galena sphalerite in dolomite-siderite vein.					
193.9	233.5	Dol-Lutite: Grey, trace of bedding at 40-50° to C.A. Increasing silt and sand component towards 233.5m. Possible stromatoporoids at 208.3m Thin black carbonaceous dol-arenite horizons at 213.3m and 217.0m. Bedding - 25° to CA. @ 217.5m	Trace sphalerite in a calcite vein at 214.0m					
233.5	238.5	Argillaceous Dol-Lutite: Grey, silty, tarnishes to green-grey colour (Resembles units near Crotty Quartzite contact in E.Z. hole at Montagu Mine.	Minor pyrite throughout					

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Amoco Minerals Australia Company

DRILLHOLE Nº DTM-84-7 **Page** 1 of 2 **drill log** metric

PROJECT DUNDAS TAS	**Nº** A84-109	**ELEVATION**		**COMMENCED** 14/8/84	HOLE SURVEY	Eastman Single Shot		B.A.D Mly Ltd					
PROSPECT MARIPOSA		**DIP COLLAR** -45°		**COMPLETED** 21/8/84	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing
CO-ORDINATES 59419 N 67300 E		**CORE SIZE** HQ		**TOTAL LENGTH** 65.5	30 m	-50°	061°m						
BEARING 090 G 06°M 072°T		**LOGGED BY** G. Kary		Machine Used Mindrill 10L B.A.D Mly Ltd	64 m	-52°	061°						

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
0	3	HW CASING ADVANCER :											
		No core recovered											
		TERTIARY											
3	5.7	River Gravel :											
		Assorted well rounded volcanic and											
		arenaceous cobbles											
		ORDOVICIAN - GORDON LIMESTONE											
5.7	15.0	Limestone ? C/W :	14.5 - 15.0 - Minor	113196	6	7	1	42	1050	2750	1	34	230
		Grey non-calcareous clay, minor fragments	disseminated galena	113197	7	8	1	50	4100	6200	2	20	270
		of fossiliferous siltstone	in clay	113198	8	9	1	48	1·34%	9000	5	18	260
				113199	9	10	1	36	1·04%	8700	5	22	160
15.0	22.0	Siderctized Carbonate Unit H/W:		113200	10	12	2	34	1·15%	3450	32	32	105
		completely siderctized unit, highly weathered		113201	12	13	1	70	2·60%	1·80%	12	40	440
		in most sections.		113202	13	14	1	44	1·39%	1·60%	10	42	420
				113203	14	15	1	42	3·35%	3·70%	12	3400	330
22.0	26.5	Cavity :		113204	15	16	1	110	1·70%	1·20%	18	7100	550
				113205	16	18	2	80	1·35%	1·43%	85	2·10%	300
26.5	38.0	Dolomitized Carbonate Unit :		113206	18	20	2	180	3·85%	2·20%	145	15·0%	510
		Grey crystalline dolomite, variably		113207	20	28	8	12	1750	2400	3	1·90%	170
		siderctic		113208	28	30	2	9	105	350	41	1·15%	110
		31.0 - 34.0m - Cavity		113209	30	31	1	7	520	1000	2	1·05%	115
		35.5 - 38.0m - Cavity											
				113210	34	39	5	8	390	780	<1	5900	85
38.0	44.5	Sandy Talc-Lutite :		113211	39	40	1	8	44	150	<1	3300	65
		Grey fine talc-Lutite with minor		113212	40	41	1	7	32	135	<1	1600	90
		to moderate quartz sand grains. Slightly		113213	41	42	1	9	30	155	<1	800	70
		weathered		113214	42	43	1	7	24	120	<1	640	55
				113215	43	44	1	6	36	160	<1	540	10
44.5	53.5	Dolomitized Carbonate Unit :	Trace pyrite	113216	44	49	5	5	145	220	<1	2000	40
		Grey finely crystalline dolomite, minor		113217	49	51	2	7	115	350	<1	3050	100
		dolomite veining		113218	51	55	4	16	910	2350	1	1950	125

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DRILLHOLE Nº DTM-84-7 **Page** 2 **of** 2 **drill log** metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
53.5	59.3	Dolomite - Limestone c/w ?:		113 219	55	56	1	42	620	6350	1	105	165
		Dark grey non-calcareous clay Banded at 45° to C.A.		113 220	56	57	1	50	280	840	<1	40	140
				113 221	57	58	1	36	910	1950	<1	40	90
		53.5 - 55.0m - Cavity		113 222	58	59	1	1100	1350	630	<1	22	135
		Faulted contact between Ordovician Gordon-Limestone and Cambrian Dundas Group Sediments											
		CAMBRIAN - DUNDAS GROUP SEDIMENTS											
59.3	63.5	Sandstone - Siltstone: Pale green to grey siltstone to sandstone. Minor quartz veining											
63.5	65.5	Shale: Orange clay grading into orange to purple hematitic shale. Bedding/Cleavage 20° to C.A.											
End of Hole													

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DRILLHOLE Nº DTM-84-8 **Page** 1 of 3

drill log
metric

PROJECT DOUDAS TAS. Nº A84-109	**ELEVATION**	**COMMENCED** 22/8/84	**BORE HOLE SURVEY**		Eastman Single Shot		B.A.D. Pty Ltd		
			Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing
PROSPECT MARIPOSA	**DIP COLLAR** -45°	**COMPLETED** 29/8/84	50m	-50°	236°m						
CO-ORDINATES 59600 N 67214 E	**CORE SIZE** HQ	**TOTAL LENGTH** 112 m	112 m	-52°	236°						
BEARING 270 G 241° M 252° T	**LOGGED BY** G.Kary	Machine Used Mindrill 10L B.A.D. Pty Ltd									

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba.
0	6.5	HW CASING ADVANCER - No core recovered. Rolling through mainly river gravel and clay.											
		ORDOVICIAN - GORDON LIMESTONE											
6.5	23.4	Fossiliferous Limestone - H/W to C/W: grey highly weathered to completely weathered slightly fossiliferous ex-limestone (weathered to clay). 50% core recovery. 14-17m - Cavity 21.5-23m - Cavity		113223	17	18	1	20	470	2450	<1	30	590
				113224	18	19	1	20	280	1900	<1	30	580
				113225	19	20	1	16	240	1500	<1	32	580
				113226	20	21	1	16	210	1650	<1	28	580
				113227	21	21.5	0.5	16	80	1300	<1	34	590
23.4	24.8	Laminated Limestone - H/W to C/W: Moderately laminated black and grey clay (ex-limestone). 70% core recovery		113228	23	25	2	14	1950	3450	1	50	450
24.8	26.0	Limestone - C/W: Dark grey calcareous clay = completely weathered limestone. 60-70% core recovery		113229	25	26	1	9	980	6350	2	2250	220
26.0	30.5	Fossiliferous Calc-Lutite H/W: Abundant shell and coral in grey calc-lutite matrix with minor stringers of black finely crystalline dolomite. Minor cross-cutting calcite/dolomite veinlets. Highly weathered throughout ~70% core recovery											
30.5	37.3	Interbedded Calc-Lutite and Dolomite: Grey calc-lutite interbedded with black finely crystalline dolomite. Highly weathered throughout 60% core recovery.	Trace sphalerite in minor calcite dolomite veins	113230	36	37	1	12	690	2800	5	2000	230
37.3	38.1	Siderite-Galena-Sphalerite-Calcite-Dolomite Mineralization H/W:		113231	37	38	1	80	2.55%	5.35%	14	7800	90

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
37.3	38.1	Dol-lutite fragments in a siderite-	10% galena -										
cont.		galena - sphalerite - calcite matrix.	sphalerite										
		Highly weathered and broken core											
		recovery 50-60%											
38.1	49.0	Interbedded Calc-Lutite and Dolomite:	Trace sphalerite	113232	38	39	1	9	1200	5000	2	3100	45
		(as 30.5 - 37.3m)	in dolomite	113233	39	40	1	6	110	360	<1	1400	75
			veins	113234	40	41	1	7	80	430	<1	1450	70
49.0	51.2	Karst / Faulty Fill:	51.1-51.2m - Up to	113235	41	42	1	8	480	1250	4	610	60
		Grey to brown clay containing minor	2% pyrite and	113236	42	44	2	7	220	640	1	660	60
		dol-arenite to dolomite and sandstone	1% galena in clay.	113237	44	45	1	5	400	860	<1	950	60
		cobble size clasts		113238	45	46	1	8	330	820	<1	1650	80
				113239	46	47	1	9	420	1350	<1	1850	130
51.2	73.3	Dolomitized Carbonate Unit HW to CW:	Minor galena and	113240	47	48	1	6	55	185	<1	380	65
		Dark grey crystalline dolomite, minor cherty	pyrite in fragment	113241	48	49	1	9	75	380	<1	470	85
		fragments. Variably weathered to clay	at 51.3 m	113242	49	50	1	65	5450	1.50%	5	1400	340
		and badly broken. 50-60% core recovery		113243	50	51	1	44	6350	1.05%	6	380	560
		52.8 - 54.0m - Faulty.	Minor galena	113244	51	52	1	28	2900	3800	2	1650	210
		59.5 - 59.8 m - White and black coarsely	throughout, mainly	113245	52	54	2	8	190	200	<1	910	60
		crystalline dolomite between and	in clay	113246	54	55	1	8	55	200	<1	1050	100
		dislocating bands of grey crystalline		113247	55	56	1	10	90	390	<1	1000	95
		dolomite. Minor dolomite crystals lining	73.1m 1% galena	113248	56	58	2	12	130	230	<1	3050	170
		small vugs. Minor dolomite veining	in dolomite veins	113249	58	59	1	12	145	270	<1	2350	220
		Possible bedding 30° to C.A. @ 59.7m		113250	59	60	1	12	1.07%	650	12	2350	105
				113251	60	61	1	44	4550	2.05%	5	820	290
73.3	82.0	Dolomitized Carbonate Unit:	74.2 - 74.4m	113252	61	62	1	12	1350	3600	1	1350	125
		Grey fine to medium crystalline	3% sphalerite,	113253	62	63	1	12	1150	1050	1	1100	135
		dolomite obliterating original carbonate	minor galena in	113254	63	64	1	12	130	440	1	1050	185
		textures. Moderate dolomite veining	a dolomite vein	113255	64	65	1	10	38	70	<1	1900	195
		and dolomite crystal lined vugs.	@ 20° to C.A.	113256	65	66	1	16	115	290	<1	590	390
		Moderately fractured. Veining generally		113257	66	67	1	18	320	1550	<1	760	390
		at 40° to C.A.		113258	67	68	1	14	185	570	<1	710	115
				113259	68	69	1	20	120	470	<1	1400	210
82.0	87.5	Dolomitized Pisolitic Unit:	Trace pyrite	113260	69	70	1	16	1100	2600	1	790	270
		Black pisolites/oncolites (5-11mm)	with some	113261	70	71	1	12	2600	3150	1	1150	370
		in a dark grey crystalline dolomite	dolomite veins	113262	71	72	1	16	4150	4200	2	830	290
		matrix. Minor dolomite veining and											
		dolomite lined vugs.											

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drill log

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba.
87.5	100.5	Cavity:											
		No core recovered, probable cavity											
100.5	104.5	Limestone? c/w:	Minor pyrite	113263	100·5	102	1·5	22	3050	1·15%	2	18	630
		Dark grey to black non-calcareous	throughout, trace	113264	102	103	1	22	125	420	<1	16	500
		clay. Minor quartz vein fragments.	galena	113265	103	104	1	22	300	1200	1	260	400
				113266	104	105	1	12	110	135	<1	510	170
104.5	108.0	Argillaceous Dol-lutite to Dolomite:	Minor pyrite	113267	105	106	1	7	60	55	<1	610	80
		Dark grey silty dol-lutite to crystalline	in veins	113268	106	107	1	16	150	780	1	420	200
		dolomite. Stockworking of fine		113269	107	108	1	16	95	240	1	430	190
		dolomite and siderite veins throughout											
		Minor black carbonaceous stringers.											
		Slightly to highly weathered											
108.0	112.5	Argillaceous Limestone? c/w:	Trace pyrite	113270	108	109	1	36	3150	3800	4	26	670
		Black to dark grey silty clay	throughout	113271	109	110	1	28	1850	3000	3	32	550
End of Hole				113272	110	111	1	24	1650	990	2	18	510
				113273	111	112	1	26	360	1050	1	16	500
				113274	112	112·5	0·5	70	750	1800	1	20	490

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drill log
metric

PROJECT DUNDAS TAS	Nº A84-109	**ELEVATION**		**COMMENCED** 24/8/84	BORE HOLE SURVEY	Depth	Dip	Eastman Bearing	Single Shot Depth	Dip	Bearing	B.A.D Pty Ltd. Depth	Dip	Bearing
PROSPECT MARIPOSA		**DIP COLLAR** -60°		**COMPLETED** 6/9/84		50m	-63°	060.5°m	200m	-64°	061°			
CO-ORDINATES 59158 N 67040 E		**CORE SIZE** HQ		**TOTAL LENGTH** 200.0m		100m	-64°	061°						
BEARING 090 G 061° M 072° T		**LOGGED BY** G. Kory		Hacking Used HWDRILL FS2 B.A.D. Pty Ltd		150m	-63.5°	061°						

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
0	29	HW CASING ADVANCER - no core recovered											
		ORDOVICIAN - GORDON LIMESTONE											
29	32	Dolomitized Carbonate Unit: Grey, finely crystalline, slightly fossiliferous. Cut by a moderate number of white dolomite veins. Minor vugs lined with coarse dolomite crystals, often showing curved crystal faces.											
32	36.5	Cavity Fill Material: Brown to grey sand and clay, unconsolidated, minor bitumen content. Occasional fragments of Dolomite (as 29-32m)		113275	32	34	2	12	1750	5850	4	2700	135
				113276	34	35	1	10	340	1000	41	2550	170
				113277	35	36	1	14	800	2750	2	2150	95
				113278	36	37	1	14	4200	3100	6	2.35%	80
36.5	38.0	Dolomitized Carbonate Unit: Grey crystalline matrix cut by intense network of coarsely crystalline creamy dolomite and white calcite veins. Minor fragments of dark grey Dol-Lutite in veins. - Fine laminations evident in a fragment at 37.7m Core is badly broken and variably weathered - ~60% core recovery	~5% sphalerite/ galena with veining	113279	37	38	1	75	1.81%	5000	50	9.95%	75
38.0	38.7	Cavity Fill Material: Grey to brown sand		113280	38	39	1	80	4.85%	1.30%	60	4.95%	75
38.7	39.5	Semi-Massive Galena: Stringers and matrix of galena containing minor dolomite and siderite fragments Broken and weathered ~50-60% recovery	30-40% galena	113281	39	40	1	110	12.5%	1.70%	70	7.70%	40

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Z_N	Ag	M_N	Ba
39.5	41.0	Silicified Zone: Finely to crypto crystalline silicified unit. Intensely fractured and weathered. ~40-50% recovery	Minor galena along fractures.	113282	40	41	1	14	2.80%	9500	22	6.50%	135
41.0	45.6	Dolomitized Carbonate Unit: Dark grey finely to crypto crystalline dolomite with stringers of galena. Highly fractured and variably weathered to clay. Minor green-grey dol-arenite fragments with possible worm burrows.	Up to 20% galena. ~60-70% core recovery	113283	41	42	1	20	2.95%	2900	22	5.85%	130
				113284	42	43	1	160	15.1%	6200	100	6.20%	85
				113285	43	44	1	70	9.85%	9800	55	5.40%	70
				113286	44	46	2	28	3.85%	6500	50	5.40%	125
45.6	50.3	Siderotized Carbonate Unit: Dark grey to green-brown, abundant small cavities after fossils. Almost completely weathered to clay. ~60-70% core recovery.		113287	46	47	1	10	1800	1250	3	2.00%	210
				113288	47	49	2	14	1800	1450	3	1.04%	390
				113289	49	52	3	7	270	560	1	3.60%	190
50.3	58.9	Interbedded Dol-Arenite and Calc-Lutite: Dark grey, fine grained, argillaceous dol-arenite with interbeds of grey variably fossiliferous (mainly gastropods) calc-lutite. Bedding 45° to C.A. @ 51m. Large (10cm) calcite vein trends 40° to C.A. (// to bedding) @ 53.9m	Trace pyrite disseminated in Dol-Arenite.										
58.9	80.0	Fossiliferous Calc-Lutite: Grey, variably fossiliferous, abundant algal balls with fossil rich horizons. Minor thin (1-2cm) beds of dark grey fine grained argillaceous dol-arenite to dol-lutite. Trace of fine calcite veins.	Minor pyrite in dol-arenite to dol-lutite										
80.0	85.0	Fossiliferous Calc-Arenite: Grey, abundant fossils, minor quartz sand grains, moderately oolitic. Minor slightly fossiliferous dark grey argillaceous											

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drill log

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
80.0 cont.	85.0	dol-arenite. Large sponge or coral at 80.1 - 80.25 m. Poor to moderate bedding - 30° to C.A. @ 82.7m	Trace pyrite replacing fossils					
85.0	90.5	Interbedded Calc-Lutite and Dol-Lutite: Grey, slightly fossiliferous and stylolitic calc-lutite and thin (1-2cm) dark grey to black argillaceous dol-lutite beds (similar to 58.9 - 80.0m). Minor calcite vein breccia @ 15-20° to C.A. - 87.3m which trend 90° to strike of bedding	Trace sphalerite in calcite vein at 86.7m					
90.5	92.6	Fossiliferous Calc-Arenite: Grey, abundant fossils, minor quartz sand grains, slightly to moderately oolitic. Minor slightly fossiliferous dark grey argillaceous dol-arenite						
92.6	92.8	Calcite ± Dolomite Vein Breccia: Calc-lutite to arenite and dol-lutite to arenite fragments in a crystalline calcite and dolomite vein matrix Parallel to bedding - 30° to C.A.						
92.8	94.8	Laminated Calc-Lutite and Dol-Lutite: 1-2 mm grey calc-lutite beds with < 1mm dol-lutite lamina. Minor slumping evident. Moderate to intense calcite veining (with minor siderite) parallel to bedding with minor associated brecciation	Up to 5% pyrite with siderite veins					
94.8	101.0	Calc-Arenite: Grey, minor quartz sand grains with minor beds of dark grey argillaceous dol-lutite to dol-arenite. Minor corals in calc-arenite Minor calcite-siderite veins at 5-10° to C.A.	1-2% pyrite in ex-carbonate ?? box works in vein at 100.0m					

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METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
101.0	101.8	Calcite - Siderite Vein Breccia: Oolitic calc-lutite and dol-lutite fragments within a calcite - siderite vein.						
101.8	103.2	Pisolitic to Oolitic Calc-Lutite: 1-7mm carbonate spheres in a grey calc-lutite matrix. Minor non-fossiliferous calc-lutite with argillaceous dol-lutite beds. Pisolites are smaller than a horizon higher in sequence described in DTM-84-2, 6, and 8. Minor to moderate calcite - siderite veining						
103.2	103.7	Calcite - Siderite Vein Breccia: - as 101.0 - 101.8 m						
103.7	104.2	Dol-Lutite Laminations within Micrite: Brown-grey micrite with minor fine dol-lutite laminations. Minor calcite eyes in micrite						
104.2	106.3	Interbedded Calc-Lutite and Dol-Lutite Grey calc-lutite beds (up to 15cm wide) interbedded with dark grey to black argillaceous dol-lutite beds (up to 5cm wide) 104.6 - 105.0 - Slightly stylolitic Calc-Arenite Bedding 35° to C.A. @ 106.2 m. Minor calcite - siderite veining						
106.3	110.1	Laminated Calc-Lutite to Dol-Lutite: Grey slightly argillaceous calc-lutite, well laminated grading down into a laminated dark grey argillaceous dol-lutite Trace calcite veins. Bedding 30° to C.A. @ 108.5. Sharp contact with underlying unit						

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
110.1	123.8	Slumped Fossil Breccia: Variety of different sized coral, oolitic calc-lutite, gastropod, calc-arenite fragments/clasts in a dark grey to black argillaceous dol-lutite matrix. Minor bedding evident @ 117.1m - 40° to C.A. @ 121.0m - 25° to C.A.	Up to 5% pyrite as stringers and fine beds from 123.3 - 123.8m					
123.8	125.3	Calc-Lutite Laminations within Micrite: Grey calc-lutite laminations within a brown-grey micrite matrix. Bedding 30° to C.A. @ 124.6m						
125.3	127.3	Fossiliferous Calc-Arenite: Gastropods and corals in a calc-arenite matrix variably slumped into a black to dark grey argillaceous dol-lutite matrix. Slumping and fossil content decreases downwards. Minor 1-2cm wide calcite veins parallel to bedding						
127.3	130.3	Laminated Calc-Lutite and Dol-Lutite: Grey calc-lutite and dark grey argillaceous dol-lutite, well laminated, grading downwards into a banded dol-lutite (5-6cm wide beds) and calc-lutite (1-2cm wide beds)						
130.3	138.6	Fossiliferous Calc-Lutite to Calc-Arenite: Grey limestone with bands and stringers of dark argillaceous dol-lutite. Large calcite-dolomite vein at 132.8-133.0m						
138.6	140.8	Laminated Calc-Lutite and Dol-Lutite: Grey calc-lutite and dark grey dol-lutite. Minor calcite eyes in calc-lutite. Bedding 25° to C.A. @ 140.2m	Minor disseminated pyrite throughout					

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drill log

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
140.8	152.5	Dol-Lutite: Dark grey dol-lutite with minor pods and beds of fossiliferous calc-lutite. Minor calcite-dolomite veining @ 20° to C.A. perpendicular to bedding	Trace sphalerite in veins.					
152.5	156.1	Slumped Stromatoporoid Calc-Lutite: Algal structures up to 10cm long and 1-2cm wide, with minor corals and gastropods oriented at various angles in a grey calc-lutite matrix. Minor stringers and beds of dark grey argillaceous dol-lutite with minor fossil content						
156.1	157.8	Interbedded Calc-Lutite and Dol-Lutite: Grey calc-lutite with thin beds (1-2cm wide) of black to dark grey argillaceous dol-lutite. Trace of algal structures and gastropods Bedding 20-25° to C.A. @ 157.6m						
157.8	164.0	Slumped Coralline-Stromatoporoid Calc-Arenite: Large (up to 12×2 cm) corals with smaller (5×0.5cm) algal structures in matrix of small (1-2mm) fossil fragments and oolites and minor quartz grains, variably slumped. Minor stringers and beds of dark grey to black argillaceous dol-lutite. Highly variable fossil content. Minor calcite veins at 50-60° to C.A.	158.8-158.85m Calcite vein with trace of sphalerite 162.4 Trace sphalerite in a crystalline calcite-dolomite vein @ 25° to C.A.					
164.0	174.3	Fossiliferous Calc-Arenite Grey sand size fossil fragments and oolites with interstitial grey fine carbonate. Minor larger coral fragments, algal pellets and calc-lutite intra clasts. Minor bands and stringers of black to	Trace of pyrite replacing algal pellets @ 165.1m Trace pyrite disseminated in dol-arenite					

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
164.0 cont.	174.3	dark grey, slightly fossiliferous dol-arenite.						
174.3	180.6	Bioclastic? Calc-Arenite: Massive, rounded oolitic and fossil fragments, minor large rounded calc-lutite intraclasts. Micritic interstitial carbonate and minor sparry calcite. Moderate stylolites. Minor calcite veining	Minor pyrite as rims on some coral fragments					
180.6	192.9	Interbedded Calc-Lutite and Dol-Lutite: Grey 5-10cm beds of slightly fossiliferous (minor corals) with thin (1-2cm) beds of black to dark grey argillaceous dol-lutite. Minor fine calcite veinlets. Bedding 25° to C.A. @ 185.3m						
192.9	195.7	Bioturbated Calc-Lutite and Dol-Arenite: Probable worm burrows producing spotted-mottled texture of grey calc-lutite and dark argillaceous dol-lutite. 192.9-193.3 - intense calcite veining with minor brecciation	Minor very pale sphalerite in calcite vein at 193.1m					
195.7	197.5	Interbedded Calc-Arenite and Dol-Arenite Wellbedded, possible minor slumping Bedding 30° to C.A. @ 197.3m						
197.5	200.0	Slumped Fossiliferous Calc-Lutite Grey coral rich calc-lutite to calc-arenite Minor large stromatoporoids. Minor beds and stringers of argillaceous dol-lutite. Pods of calc-lutite within dol-lutite may be slump texture	Trace pyrite at Calc-Lutite - Dol-Lutite contacts					
End of Hole								

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DRILLHOLE Nº DTB - 84 - 1 Page 1 of 2

drill log
metric

PROJECT	DUNDAS - TASMANIA	Nº A84 - 109	ELEVATION		COMMENCED	21/5/84	HOLE SURVEY							
PROSPECT	BANNOCKBURN.		DIP COLLAR	−50°	COMPLETED	5/6/84	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing
CO-ORDINATES	56900 N	65700 E	CORE SIZE	HQ, NQ	TOTAL LENGTH	101.5m	50.5	50½°	080°						
BEARING	090° G 080° M 091° T		LOGGED BY	P.A JONES	MACHINE USED	WARMAN SCOUT: OVERLAND									

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
		SILURIAN - CROTTY QUARTZITE.						
0.00	43.50	Roller Bit through sequence of quartzites, sandstones and siltstones.						
43.50	48.60	Quartz Sandstone: White to pale brown, fine to medium grained, massive quartz sandstone containing minor zones of moderate porosity due to leaching of silty material. Bedding 67° to c.a. @ 45.5 m.						
48.60	50.55	Bioturbated Sandstone: Grey brown, bioturbated, soft sediment deformed?, argillaceous medium grained sandstone. Core badly broken, ruddy.						
50.55	51.90	Coarse Grained Quartz Sandstone: Massive sequence of coarse with minor medium grained quartz sandstones. Minor quartz veining. Bedding 67° to ca @ 51.35 m.						
51.90	61.40	CW Siltstone / Shale: Interbedded, massive, fat, mottled clays, coloured from light grey, grey brown and dark grey and containing minor beds?? of black lignite (resinous lustre - very light).						
61.40	63.80	Silty Bioclastic Sandstone: Highly weathered white to grey brown, bioclastic silty, medium grained sandstone. Sequence possibly brecciated towards base. Bedding 57° to ca @ 63.3 metres.						

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DRILLHOLE Nº DTB-84-1 Page 2 of 2

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
63.80	68.80	Brecciated CW Siluro/Ordovician Contact: Sequence of massive grey to yellow clays (relict breccia textures) with fragments of Crotty Quartzite incorporated within, sections of quartz-lithic (limestone, sandstone, siltstone) sands - sludge material? GORDON LIMESTONE - ORDOVICIAN.						
68.80	74.50	CW Pyritic Argillaceous Dolomite: Completely weathered with minor highly weathered black in part brecciated and massive to weakly laminar pyritic (pyritized coral fragments and slugs within clays) argillaceous quartz veined in part, weakly micaceous dolomite.	Minor pyrite.					
74.50	99.50	Dolomitized weakly silicified Limestone / Dolomite:	Gn, sl (red/orange) as crystalline slugs in dolomite lined vughs and dolomite healed crackle breccias. 81.2 - 81.27 = 4% Pb/Zn.					
HQ to NQ @ 81.5m.		Grey coarsely crystalline (dolomitization) massive to weakly bedded (ghosted due to dolomitization) possibly in part soft sediment deformed limestone / dolomite ?? Dolomitization has created crackle breccia zones and open spaces filled by coarse grained crystalline dolomite minor gn, sl and trace pyrite. Sphalerite orange/red colour. Minor cavities up to 1m. Dolomitization more prominent in the upper section of the sequence. Bedding 60° to ca @ 79.8 m; 57° to ca @ 87.0m and 53° to ca @ 94.8m.						
99.50	101.50	CW Black Argillaceous Dolomite: Very weakly calcareous undolomitized, black argillaceous weakly pyritic primary dolomite. Recoveries ≈ 75%.	Minor pyrite.					
		HOLE ABANDONED 101.5m - Drilling Difficulties						

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DRILLHOLE Nº DTB-84-1A Page 1 of 4

drill log

PROJECT	DUNDAS - TASMANIA NºA84-109	ELEVATION		COMMENCED	6-6-1984	CORE HOLE SURVEY Eastman Single Shot - Overland Pty Ltd.								
PROSPECT	BANNOCKBURN.	DIP COLLAR	-50°	COMPLETED	29-6-1984	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing
CO-ORDINATES	56900 N 65699 E	CORE SIZE	HQ, NQ	TOTAL LENGTH	212.70	103	-58°M	077°M						
BEARING	090° G 080° M 091° T	LOGGED BY	P.A. JONES.	MACHINE USED: WARMAN SCOUT - OVERLAMP.		186	-55°	071.5°						

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
		SILURIAN - CROTTY QUARTZITE/ ORDOVICIAN - GORDON LIMESTONE.						
0.00	87.20	Sequence of Silurian sandstones and siltstones overlying Ordovician limestones and dolomites. Depth to contact unknown, possibly in order of 70 metres (See DTB-84-1)						
87.20	96.20	Dolomitized Carbonate: Massive to weakly bedded sequence of grey to dark grey, textureless, heavily dolomitized trace galena associated, weakly stylolitized fine to medium grained weakly pyritic calc-lutite?? Numerous clots and patches of white dolomite occasionally containing coarsely crystalline galena. Minor fine quartz veinlets. Core very broken (generally along fracture planes) - good recoveries. Textures within rock appear ghosted - due to dolomitization.	Trace galena within secondary vugh filling dolomite.					
96.20	97.40	Crackle Breccia: Very small to 4cm width highly angular host rock fragments (grey massive, pyritic, textureless limestones?) Set in a weakly silicified and extensively dolomitized matrix. Sequence is coarsely crystalline, shows ghosted textures and minor dolomite veinlets. Breccia in part clast support, however, overall is matrix support. Possibly hydraulic - dolomitization feature. Trace galena with dolomite veining.	Trace galena in matrix to breccia. Abundant pyrite in fragments.					
97.40	103.00	Dolomitized Carbonate: Massive to weakly bedded, heavily dolomitized (coarsely crystalline) grey to dark grey ghosted limestone?? Minor quartz veining	Trace galena.					

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DRILLHOLE Nº DTB-84-1A **Page** 2 of 4 **drill log** metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
97.40	103.00	CON'T: and abundant dolomitized - calcite clots and patches occasionally containing trace galena. Bedding 54° to ca @ 101.7 metres.											
103.00	105.30	Possible Breccia Zone: Weathered and weakly mineralized contact zone between dolomitized and calcareous rocks. Sequence highly weathered with numerous small and large angular to sub angular fragments of limestone, dolomite, galena, pyrite set in a light grey argillaceous (non-calcareous) matrix. Minor quartz fragments also.	Minor gn/py as slugs or fragments within breccia ?? 103.00 - 105.30 m.	113180	103	104	1	32	1150	1000	3	155	110
				113181	104	105.3	1.3	135	8900	3600	6	95	165
105.30	128.50	HW - CW Dolomite / Bioclastic Dolomite / Argillaceous Calc-lutite:	Trace py	113182	113	114	1	48	1.30%	2.45%	8	970	65
			Gn/sl crystals and	113183	114	114.9	0.9	24	1650	3300	3	1000	40
HQ → NQ @ 117 m.		Black highly to completely weathered, broken minor clayey sequence of massive, weakly pyritic dol-lutites, weakly porous bioclastic dollutites and argillaceous bioclastic calc-lutites. Core is weakly dolomitized. Trace py. Nil recoveries over localized narrow zones - overall very poor recoveries ≈ 30%. Weak galena-sphalerite mineralization assoc. with fine siderite veined and brecciated rocks between 113.4 to 117.2 as blebs within the argillaceous matrix. Possible relict bedding texture 43° to ca @ 107.2 m. Possible fault zone 120 - 128.50m.	blebs with argillaceous matrix 113.4 - 117.20 m. Coarse grained sl @ 119.3 as slugs within rubbly core	113184	115.7	117.2	1.5	40	3600	2500	3	410	85
128.50	170.50	Soft Sediment Deformed Calc-lutite / Dol-lutite / Bioclastic Calc-arenite: Interbedded sequence of soft sediment deformed, massive grey calc-lutites, light grey bioclastic calcarenites (varying in width from 2-5cm) and black argillaceous dol-lutites (averaging ≤ 2cm in width.											

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
128.50	170.50	CON'T: Bedding contacts deformed and contorted due to soft sediment deformation and moderately stylolitized. The entire sequence is cut by zones of complete weathering giving rise to sections of extremely poor recoveries. Recoveries overall ≈ 50-60%. Core is moderately calcareous except for dol-lutite units. Bedding 50° to ca @ 131.80, 52° @ 157.4m.											
170.50	177.30	Argillaceous Dol-lutite: Sequence of badly broken, black, massive to foliated argillaceous dol-lutite. Core recoveries 40-50%.											
177.30	190.20	Slump Brecciated Bioclastic Limestone/ Dolomite: A sequence of interbedded grey massive calc-lutites and abundant black argillaceous dol-lutites becoming increasingly slump brecciated downhole with increasing fragments of corallinie, stromatoporoid, shelly debris set in an argillaceous matrix. Good core recoveries. Minor calcite veining, minor weathered zones with clay matrix.											
190.20	191.50	Laminar Calclutite/ Pyritic Dol-lutite: Sequence of very laminar light grey calc-lutites and pyritic black dol-lutites. Dol-lutite lamellae varying from 0.1mm to 1cm (averaging 1-2mm). Pyrite occurs as very fine grained disseminations parallel to bedding. Minor load casting and current textures through calc-lutite interbeds. Bedding 62° to ca @ 190.6m.	Abundant very fine grained pyrite parallel to bedding.	113185	190.2	191.5	1.3	8	65	120	2	230	195

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
191.50	209.10	Chaotic Fossil Fragmental Breccia: Chaotic sequence of ragged fragments and clasts of massive light grey calclutite, bioclastic calc-arenites, dol-lutites, oolitic limestones, coralline, Stromatoporoid, pisolitic and shelly debris set in an argillaceous weakly pyritic matrix. Minor sideritization @ 194.5 - 197.85 m?? Yellow-red sphalerite as coarsely crystalline aggregates occurs in a calcite matrixed vein @ 193.7 - 193.75 m averaging ~ 10% Zn. Core recovery ≈ 90%.	5cm wide calcite matrix vein? Breccia @ 193.70 m. contains yellow-red sl as coarsely crystalline aggregates, av ≈ 10% Zn.	113186	193.6	194	0.4	12	510	1200	3	470	90
209.10	212.70	Interbedded Dol-lutite/Calc-lutite: Sequence of foliated black argillaceous dolomite interbedded with bioclastic calc-arenites and grey calclutites. Zones within the sequence have minor coralline fragments and show minor zones (up to 5cm in width) of slump breccias. Minor pyrite blebbs occur with one small section of slump breccia. Bedding 48° to ca @ 211.70 metres.	Minor pyrite.										
		END OF HOLE 212.70 metres.											

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DRILLHOLE Nº DTSC-84-1 **Page** 1 of 3

drill log
metric

PROJECT	DUNDAS-TASMANIA Nº A84-109	**ELEVATION**		**COMMENCED**	13-7-1984	**HOLE SURVEY** Eastman Single Shot - BAD Pty Ltd.								
PROSPECT	BANNOCKBURN - SUNNY CORNER	**DIP COLLAR**	-45°GN	**COMPLETED**	24-7-1984	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing
CO-ORDINATES	57781 N 65388 E	**CORE SIZE**	HQ	**TOTAL LENGTH**	70 m	15	49°	030						
BEARING	039° G 029° M 040° T	**LOGGED BY**	P.A. JONES	MACHINE USED: MINDRILL 10L BAD Pty Ltd		33	49°	—						

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
		TERTIARY - RECENT.											
0.00	3.00	Quartz gravel scree. Pink/beige sands and gravels overlain by humic sands and minor peat.											
		ORDOVICIAN - GORDON LIMESTONE.											
3.00	16.50	Carbonaceous Dol-lutite: Black massive to weakly laminar, very pyritic, carbonaceous, argillaceous completely weathered dolomitic clays (Dol-lutite?). Sections of core contain disseminated aggregates of yellow to pale red sphalerite and very fine grained galena.	By very fine grained av 10-15%, more massive py @ 10.20m possibly tertiary bog iron. Sp diss @ 4.5m, 12.0m, gn @ 12.0 m.	102851	2	4	2	12	2100	400	3	12	220
				102852	4	5	1	20	6600	1500	1	14	340
				102853	5	6	1	22	6400	700	<1	16	420
				102854	6	7	1	22	3100	850	<1	20	370
				102855	7	8	1	20	1600	1000	1	18	320
				102856	8	9	1	20	630	750	1	22	330
				102857	9	10	1	18	500	1800	<1	30	310
				102858	10	11	1	28	930	4400	5	24	310
16.50	24.10	Karst - Infill Breccia: Highly weathered massive clay matrixed cave breccia, light grey to yellow-red in colour. Breccia fragments comprised of Silurian cretty quartzite and Ordovician limestone/ dolomite units, within a clay matrix. Minor pyrite/galena @ 23.5 - 24.10m in massive clay matrixed grey breccia with minor pyrite.	Trace gn, pyrite @ 23.5 to 24.10 m.	102859	11	12	1	250	7300	6500	35	24	360
				102860	12	13	1	160	8000	3700	16	26	280
				102861	13	14	1	32	3100	8500	5	26	230
				102862	14	15	1	26	3800	8200	6	28	250
				102863	15	16	1	38	6000	1.10%	4	28	260
				102864	16	17	1	26	2200	3600	1	240	370
				102865	17	19	2	20	210	310	<1	1600	510
				102866	19	20	1	16	65	1.10%	<1	1650	330
				102867	20	21	1	20	70	1450	<1	780	480
				102868	21	22	1	20	48	900	<1	1100	560
24.10	26.00	Argillaceous Limestone: Completely weathered pyritic and calcitic black massive featureless argillaceous limestone?	Minor pyrite as very fine grained disseminat-ious.	102869	22	23	1	16	140	1600	<1	1000	530
				102870	23	24	1	16	330	1100	<1	1200	360
				102871	24	25	1	10	210	1700	1	540	150
				102872	25	26	1	30	2500	1710	6	230	185
26.00	28.90	Interbedded Limestone / Argillaceous Dol-lutite: Highly to completely weathered grey weakly fossiliferous bioclastic massive limestone (calclutites?) interbedded with black to dark grey foliated? very pyritic argillac. clayey dol-lutite.	Minor pyrite in Dol-lutite.	102873	26	27	1	6	180	570	1	440	115
				102874	27	28	1	6	170	1250	<1	170	75
				102875	28	29	1	6	26	330	<1	160	40

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DRILLHOLE Nº DTSC-84-1 **Page** 2 **of** 3 **drill log** metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
28.90	37.50	Calcareous Sandstone:	Pyritic aggregates	102876	29	30	1	8	12	410	<1	195	90
		Dark grey massive, pyritic, calcareous	and cusp like	102877	30	31	1	8	8	180	<1	3800	125
		medium to fine grained quartz sandstone,	pyrite fragments.	102878	31	32	1	8	38	195	<1	150	185
		occasionally showing weak silicification		102879	32	33	1	8	12	130	<1	300	75
		31.0 - 33.7m. interbedded with		102880	33	34	1	8	16	210	<1	2300	185
		completely weathered black to dark		102881	34	35	1	10	200	990	<1	520	185
		grey argillaceous and weakly sandy		102882	35	36	1	6	120	510	<1	180	115
		ebays. (Limestone - sandy?).		102883	36	37	1	6	14	95	<1	120	40
				102884	37	38	1	6	90	460	<1	130	30
37.50	40.00	CW Limestone:		102885	38	39	1	6	320	1900	<1	430	35
		Dark grey, massive completely weathered		102886	39	40	1	4	420	1700	<1	390	40
		limestone with minor highly weathered											
		fragments within clayey matrix (breccia											
		appearance - due to weathering) Limestone											
		weakly fossiliferous. Minor argillaceous											
		black dol-lutite interbeds.											
40.00	47.60	Veined Limestone:		102887	40	41	1	6	36	200	<1	220	45
		Highly weathered light to dark grey limestone		102888	41	42	1	6	14	150	<1	160	50
		with interbeds of black argillaceous dol-		102889	42	43	1	6	12	65	<1	200	60
		lutite. Core moderately calcite veined,		102890	43	44	1	6	65	270	<1	230	65
		extensively broken with clay matrix partly		102891	44	45	1	6	260	860	<1	220	65
		washed away. Cavity 41.5 - 43.0 metres.		102892	45	46	1	6	65	950	<1	135	40
				102893	46	47	1	4	22	120	<1	210	30
47.60	52.20	Soft Sediment Deformed Interbedded											
		Limestone / Argillaceous Dol-lutite:											
		Stylolitized fresh light grey unfossiliferous											
		massive calc lutites interbedded with											
		thin dark grey to black argillaceous											
		dolomite beds. Lithologic boundaries											
		heavily stylolitized, weak calcite veining											
52.20	60.40	HW Limestone:											
		Dark grey heavily broken, clayey											
		matrixed, highly weathered limestone.											
		Possible relict breccia textures. Limest											
		one possibly interbedded argillaceous											
		calclutite with major proportion of											

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
52.20	60.40	CON'T: argillaceous dol-lutite. Very minor calcite veinlets/vug. Minor soft sediment deformation textures?						
60.40	70.00	Argillaceous Limestone: Dark grey blocky and broken, massive argillaceous, calclutites, with minor zones of massive black clay.						
		END OF HOLE 70.00 metres.						

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DRILLHOLE Nº DTSC-84-2 **Page** 1 of 3 **drill log** metric

PROJECT	DUNDAS - TASMANIA NºA84-109	**ELEVATION**		**COMMENCED**	25-7-1984	**BORE HOLE SURVEY** Eastman Single Shot - BAD Pty Ltd.							
PROSPECT	BANNOCKBURN - SUNNY CORNER	**DIP COLLAR**	-45°	**COMPLETED**	31-7-1984	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing
CO-ORDINATES	57807 N 65356 E	**CORE SIZE**	HQ	**TOTAL LENGTH**	70.2m	35	49°	016						
BEARING	029° G 019° M 030° T	**LOGGED BY**	P.A. JONES	MACHINE USED	MINDARL 101 BAD Pty Ltd.	70	48°	018						

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
		TERTIARY - RECENT.											
0.00	4.20	Quartz gravel scree: Pink/beige sands and gravels overlain by humic sands and peat.											
		ORDOVICIAN - GORDON LIMESTONE.											
4.20	16.20	CW Argillaceous Dol-lutite: Sequence of massive, black, argillaceous, carbonaceous, completely weathered dol-lutite (clays). Thin zones within clay being silty to fine grained sandy with a black argillaceous matrix. Minor relict laminations.		102894	4	5	1	18	1300	400	<1	44	155
				102895	5	6	1	16	990	640	<1	12	270
				102896	6	7	1	16	310	480	<1	10	410
				102897	7	8	1	16	320	1500	<1	12	410
				102898	8	9	1	18	970	1250	<1	24	360
				102899	9	10	1	18	2200	2600	<1	20	310
				102900	10	11	1	14	2000	3100	<1	22	310
				102845	11	12	1	20	2300	7000	<1	14	310
16.20	19.30	HW Argillaceous Limestone: Zone of highly to completely weathered grey to dark grey, massive argillaceous limestone with fine to medium grained crystalline pyrite evident along fracture planes and surfaces. Core very rubbly, recoveries 30-40%.	Minor pyrite.	102846	12	13	1	16	1500	5300	<1	16	270
				102847	13	14	1	18	390	2500	<1	14	240
				102848	14	15	1	66	2700	3400	8	24	230
				102849	15	16	1	30	1200	2100	4	34	230
				102850	16	17	1	20	830	2200	2	320	300
				73727	17	18	1	10	120	360	<1	340	100
				73728	18	19	1	12	240	770	1	910	105
19.30	23.70	Karst - Infill Breccia:- Cream Coloured. Angular and rounded fragments of beige to grey quartzite, black argillaceous dol-lutite and light grey calc-lutites set within a cream coloured matrix of micaceous clay. Minor galena, pyrite fragments and crystals also found within the clay matrix.	Trace galena/py within breccia matrix.	73729	19	20	1	30	730	530	2	460	350
				73730	20	21	1	24	260	350	<1	1500	380
				73731	21	22	1	36	1050	1900	2	1050	350
				73732	22	24	2	22	140	330	<1	400	460
23.70	34.20	Karst Breccia :- Orange Coloured. Matrix support breccia with rounded and angular clasts of grey to red brown quartzite, sandstone, jasper and minor		73733	24	25	1	28	32	42	<1	85	510
				73734	25	26	1	24	26	50	<1	200	520
				73735	26	27	1	26	55	90	<1	320	540
				73736	27	28	1	34	32	330	<1	2050	450
				73737	28	29	1	28	38	100	<1	330	530

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DRILLHOLE Nº DTSC-84-2 Page 2 of 3

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
23.70	34.20	CON'T: siltstone (crotty quartzite – Moina fragments) within an orange/ brown micaceous clay.		73738	29	30	1	30	26	85	<1	450	500
				73739	30	31	1	24	28	115	<1	710	490
				73740	31	32	1	28	66	140	<1	230	490
				73741	32	33	1	24	34	50	<1	1400	530
34.20	36.35	Karst Breccia: Cream Coloured. Predominantly angular grey limestone and black dolomite with minor sandstone (rounded and angular) clasts within a cream coloured micaceous clay matrix. Minor clasts and coystals of galena and pyrite within breccia matrix. No sorting evident within the breccia.	Trace gn, py in breccia matrix.	73742	33	34	1	30	42	38	<1	1100	550
				73743	34	35	1	24	70	46	<1	1300	460
				73744	35	36	1	18	620	360	<1	1150	320
				73745	36	37	1	20	2700	1150	1	130	240
36.35	38.70	CW Argillaceous Dol-lutite / Calc-lutite: Sequence of black, argillaceous, weakly pyritic, moderately calcareous completely weathered dol-lutites and calc-lutites.	Trace pyrite.	73746	37	38	1	12	28	70	<1	65	120
				73747	38	39	1	14	18	60	<1	160	120
38.70	50.20	HW to CW Limestone / Dol-lutite: Interbedded rubbly and broken, highly to completely weathered sequence of massive black argillaceous dol-lutites and bioclastic dark grey argillaceous? limestones. Rock moderately soft sediment deformed. Bioclastic calcarenite? and calclutites? contain shelly fragments and casts, corallinic? fragments and other fossil debris. Numerous cavity zones 43.2 - 44.7; 46.4 - 47.6; 47.8 - 49.0 m.		73748	39	40	1	10	14	24	<1	330	125
				73749	40	41	1	10	8	38	<1	360	160
				73750	41	43	2	12	270	530	<1	320	120
				112151	43	45	2	12	26	100	<1	350	250
				112152	45	47	2	10	34	125	<1	100	115
				112153	47	49	2	6	16	42	<1	80	40
50.20	70.20	MW to HW Soft Sediment Deformed Calc-lutite / Dol-lutite / Bioclastic Calc-arenite: Massive grey unfossiliferous calc-lutites interbedded with thin beds of argillaceous black weakly pyritic dolomite. Minor interbeds of bioclastic (shelly, pisolites, corals) calcarenites present. Unit moderately soft sediment deformed. Cavities 55.2 - 58.8; 64.20 - 64.95; 67.2 - 68.0;											

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
50.20	70.20	CON'T: 68.7-70.2; Bedding 60° to ca @ 50.7m; 60° to ca @ 51.8m; 55° to ca @ 66.8 metres.						
		END OF HOLE 70.20 metres.						

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drill log
metric

PROJECT DUUDAS TAS. Nº A84-109	**ELEVATION**	**COMMENCED** 1/8/84	**BORE HOLE SURVEY** Eastman Single Shot B.H.D. Pty Ltd.								
PROSPECT BANNOCKBURN / SUNNY CORNER	**DIP COLLAR** - 45°	**COMPLETED** 7/8/84	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing
CO-ORDINATES 57800 N 65870 E	**CORE SIZE** HQ, NQ	**TOTAL LENGTH** 72.1m	35m	-47°	080° m						
BEARING 090 G 080° M 091° T	**LOGGED BY** G. Kary	Machine Used MINDRILL 10L B.H.D. Pty	70m	-48.5°	080°						

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
0	2	HW ROLLER											
		SILURIAN - CROTTY QUARTZITE											
2	5.5	Quartzite: White, well bedded, fine to medium grained. Minor fossil segments Bedding 45° to C.A. @ 5.3m. 40-50% core recovery											
5.5	8.0	Sandstone: Brown to dull olive, fine grained, Moderate quartz veining parallel to bedding which are partially weathered and infilled with bitumen Bedding 70° to C.A. @ 7.7m	Minor galena in quartz veins.	112 177	6	7	1	18	3450	360	3	10	200
				112 178	7	8	1	100	7300	1050	12	8	260
8.0	9.7	Bioturbated Sandstone: Grey to dull olive, extensively bioturbated Minor bedding showing slump textures. Bedding 70° to C.A. @ 8.9											
9.7	13.4	Sandstone C/W: Olive to grey clay, minor relict sandstone 8.0 - 9.7m. 40% core recovery											
13.4	16.0	Quartzite: Grey, silicified, varcably rounded pebbles and cobbles of quartzite. Moderate quartz veining 80% core recovery											
16.0	25.1	Shale ? C/W: Grey clay containing small shale and quartz vein fragments	Minor galena as clusters in clay	112 179	16	18	2	28	4250	5300	7	20	410
				112 180	18	19	1	22	6550	2100	6	18	310
				112 181	19	20	1	28	8450	4450	7	18	460
				112 182	20	22	2	34	570	860	2	8	720

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DRILLHOLE Nº DTSC-84-3 **Page** 2 **of** 3 **drill log** metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
16.0	25.1	Possible Bedding 15-20° to C.A. @ 17.7m		112 183	22	23	1	28	460	1650	2	6	570
cont		Large quartzite segment at 19.0m.		112 184	23	24	1	44	3200	4800	4	16	600
		50-60% core recovery		112 185	24	25	1	34	1500	1000	4	14	800
25.1	28.0	Siltstone:	Trace galena	112 186	25	26	1	30	2400	340	3	130	590
		Light grey, poorly bedded, minor	in clays at	112 187	26	27	1	24	1250	650	2	1100	660
		carbonaceous lamina. Variably	26.5 to 28.0 m	112 188	27	28	1	22	2000	990	3	700	620
		weathered to clay, clay content											
		increases towards 28.0m Minor											
		quartz vein fragments											
28.0	33.2	Siderctized Unit:	Trace galena	112 189	28	33	5	16	2150	4050	3	1.55%	250
		Brown dense siderctic fragments. Minor											
		quartz vein fragments. < 10% core											
		recovery. Extensive small vuggies											
33.2	34.0	Clay:	1% galena with	112 190	33	34	1	38	2.70%	2600	24	400	760
		Grey clay, minor quartz vein fragments	quartz vein										
		30% core recovery	fragments.										
34.0	37.8	Quartzite:	Trace to minor										
		Grey, variably silicified. Minor thin	galena in quartz										
		quartz veins. Possible bedding 45°	veins.										
		to C.A. @ 34.8 m 50% core recovery											
37.8	47.5	Quartzite:		112 191	38	40	2	44	2550	1300	4	28	220
		Grey, slightly gritty. Minor quartz		112 192	40	41	1	22	1800	600	2	16	145
		veining. Possible fault zone at		112 193	41	42	1	16	2000	300	2	14	125
		47.5m. 30-40% core recovery.		112 194	42	44	2	16	1500	190	1	14	90
				112 195	44	46	2	32	1100	430	5	38	155
		ORDOVICIAN - GORDON LIMESTONE		112 196	46	48	2	38	7950	2750	12	1500	440
47.5	53.5	Dolomitized Limestone:	Trace galena	112 197	48	49	1	32	8200	2900	12	4100	400
		Grey dolomitized stylolitic limestone,	in dolomite	112 198	49	50	1	18	710	430	2	1000	105
		Abundant thick (1-5 mm) carbonaceous	veins	112 199	50	51	1	28	600	360	30	1500	155
		stringers. Abundant dolomite veining.		112 200	51	52	1	20	730	390	20	1500	140
		48.8-48.9 - Possible sedimentary breccia,		113 151	52	55	3	70	2.10%	6200	12	2750	650
		silty fragments in a dark grey slightly											
		calcareous matrix.											

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drill log
metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
53.5	57.2	Limestone ?: Grey non-calcareous clay, abundant black shale fragments, minor quartz vein fragments. Very poor core recoveries ~ 30%	Trace galena fragments in clay matrix	113152	55	57	2	65	3·70%	3200	3	220	650
57.2	58.8	Sidericized Carbonate: Tan, dense, sidercitic, possible bedding @ 65° to C.A. Very poor core recoveries ~ 30%	Up to 1% galena in siderite material	113153	57	58	1	46	2·05%	4150	3	1·15%	370
				113154	58	59	1	36	1·04%	5650	18	1·10%	570
58.8	61.0	Calc-Lutite ? c/w?: Light grey clay, minor argillaceous lamina Obvious warping of layers by drilling, producing layering at 90° to C.A.		113155	59	60	1	34	3050	560	80	820	550
				113156	60	61	1	60	8750	320	60	38	570
61.0	61.9	Calc-Lutite ? c/w?: Black carbonaceous clay, massive.		113157	61	62	1	1000	3·85%	500	3	42	580
61.9	63.8	Calc-Lutite ? c/w?: as 58.8 - 61.0m		113158	62	63	1	310	1·83%	460	48	32	540
				113159	63	64	1	180	1·78%	140	55	18	580
63.8	68.5	Cavity Fill ?: Rounded quartz vein and shale fragments in a grey to brown clay matrix											
68.5	72.1	Silicified Limestone ?: Slightly rounded siliceous fragments, intense quartz vein stockworking. Broken into pieces < 4cm. Probable fault zone Stopped Hole - unable to penetrate further.											
E.O.H.													
		0 - 70m HQ core											
		70 - 72.1m NQ core											

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DRILLHOLE Nº DTSC-84-4 **Page** 1 of 3 **drill log** metric

PROJECT DUNDAS - TASMANIA Nº A84-109	**ELEVATION**		**COMMENCED** 8-8-1984	BORE HOLE SURVEY Eastman Single Shot - BAD Pty Ltd.								
PROSPECT BANNOCKBURN - SUNNY CORNER	**DIP COLLAR** -45°		**COMPLETED** 22-8-1984	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing
CO-ORDINATES 57910 N 65620 E	**CORE SIZE** HQ, NQ		**TOTAL LENGTH** 105 m.	50	52.5°	204°						
BEARING 214° G 204° M 215 T°	**LOGGED BY** P.A. JONES		MACHINE USED: HYDRIL 10L - BAD Pty Ltd	105	52	204°						

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
		SILURIAN - CROTTY QUARTZITE.											
0.00	28.50	Roller Bit - through weathered quartz sandstones and siltstones.											
28.50	33.90	Massive Quartz Sandstone: White-grey, well sorted, massive to thickly bedded weakly bioclastic medium grained quartz sandstone. Core moderately broken, minor thin quartz veinlets. Bedding 70° to ca. @ 31.20 m.											
33.90	37.40	Bioturbated? Silty Sandstone: Dark grey to grey brown, silty, bioturbated (nodular texture?) fine to medium grained sandstone. Fracture planes coated in bitumen?, core moderately to highly weathered, blocky, becoming progressively silty downhole. Core recoveries 60-70%.											
37.40	45.80	Pyritic Siltstone: Grey to black, highly to completely weathered, argillaceous pyritic siltstone. Minor relict laminations, possible weak bioturbation. Core recovery 50-60%	Minor disseminated pyrite.										
45.80	51.50	Bioturbated HW Silty Sandstone: Grey to grey-brown, silty, fine to medium grained, highly weathered, well sorted quartz sandstone. Core badly broken with core recoveries of 70-80%.		113290	50	52	2	18	1500	2150	2	110	155
		ORDOVICIAN - GORDON LIMESTONE.											
51.50	58.00	CW Black Dol-lutite:	Abundant pyrite.	113291	52	53	1	30	900	1750	2	40	270
				113292	53	54	1	20	210	1100	1	36	330

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DRILLHOLE Nº DTSC-84-4 **Page** 2 **of** 3 **drill log** metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
51.50	58.00	CON'T: Completely weathered, black with minor dark grey argillaceous dolomitic clays (dd-lutite??). Clay contains abundant fine grained disseminated and blebby pyrite. Clay cut by cw dolomite (cream coarsely crystalline) veins.		113293	54	55	1	16	85	420	<1	32	370
				113294	55	56	1	24	2450	870	2	250	270
				113295	56	57	1	14	220	240	1	250	200
				113296	57	58	1	14	460	220	1	2750	190
58.00	62.50	Extensively Dolomitized Carbonate: Highly weathered, extremely broken, and extensively dolomitized carbonate? Minor argillaceous component upon weathering. Moderate dolomite veining and vugh infilling. Core recoveries of approximately 75%. Trace pyrite associated with dolomite veining.	Trace pyrite.	113297	58	59	1	9	250	200	<1	5900	95
				113298	59	60	1	9	230	310	<1	7800	90
				113299	60	61	1	14	120	260	<1	6350	35
				113300	61	62	1	8	300	440	1	2450	55
				113301	62	63	1	4	230	380	1	2150	50
62.50	77.20	Extensively Dolomitized Quartz Lithic Carbonates ??: Moderately weathered, extensively broken and dolomitized, speckled quartz, lithic grey carbonate? Original sediment possibly porous and permeable, hence the extensive dolomitization. Core cut by dolomite veinlets and vugh infills. Quartz and lithic grains subrounded to rounded and sand grains generally < 1-2 mm and lithic fragments < 3 mm across. Trace to minor galena (trace sphalerite-pyrite) from 65-66 m in dolomite veinlets and vugh fillings	Trace to minor gn/sl/py assoc with dolomite veins and vughs.	113302	63	64	1	7	1300	320	1	1850	50
				113303	64	65	1	32	1800	1050	2	1850	155
				113304	65	66	1	34	2650	550	2	1250	150
				113305	66	67	1	40	1·42%	6650	4	830	35
				113306	67	68	1	18	410	600	1	1150	55
				113307	68	69	1	18	220	550	<1	1200	60
				113308	69	70	1	24	140	220	<1	1050	10
77.20	86.70	Dolomitized Quartz-lithic Carbonate and Argillaceous Dolomite:	Trace gn in dolomite veins and veinlets.										
HQ→NQ @ 77.5 m		Interbedded sequence of extensively dolomitized moderately weathered dolomite veined and vugh infilled quartz lithic speckled carbonates and argillaceous weakly dolomitized grey to black, fine grained? primary dolomite. Cavity 77.60-78.00 metres, 79.5-80.0 m.											

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drill log
metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
77.20	86.70	CON'T: Trace gn within dolomite veins. Fracture and cleavage surfaces coated with carbonaceous material. Possible relict bedding? (sst-dolomite contact) of 10° to ca @ 81.20 metres.											
86.70	95.50	Extensively Dolomitized Quartz Lithic Carbonates: Sequence of moderately to highly weathered, blocky, massive, speckled (cream and grey) grey quartz lithic and more massive grey fine grained carbonates. Core heavily dolomite veined with trace galena. Textures becoming finer grained downhole.	Trace gn in dolomite veins.										
95.50	105.00	Partially Dolomitized Primary Dolomite (Dolomitized Limestone ??): Moderately weathered, fine grained, massive, grey, occasionally fossiliferous (weathered out holes after beasts). Partially dolomitized 101.40 – 103.0 m. primary dolomite – possibly weakly argillaceous. Core recoveries from 103 to 105 m – NIL. Possible pressurized FAULT ZONE (BAD MY Ltd) Unable to penetrate or core – therefore hole stopped. END OF HOLE 105. metres.		113309	100	101	1	10	90	80	<1	410	90
				113310	101	102	1	20	460	1650	1	1500	80
				113311	102	103.6	1.6	8	95	160	<1	550	60

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DRILLHOLE Nº DTSC-84-5 **Page** 1 of 2 **drill log** metric

PROJECT DUNDAS - TASMANIA NºA84-109	**ELEVATION**		**COMMENCED** 23-8-1984	**CORE HOLE SURVEY**										
PROSPECT BANNOCKBURN - SUNNY CORNER	**DIP COLLAR** -45°		**COMPLETED** 10-9-1984	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing		
CO-ORDINATES 58070 N 65387 E	**CORE SIZE** HQ		**TOTAL LENGTH** 54 m											
BEARING 221° G 211° M 222°T	**LOGGED BY** P.A. JONES		MACHINE USED: MINDRILL 10L - BAD My Hd.											

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
		SILURIAN - CROTTY QUARTZITE.						
0.00	10.50	Roller bit through quartz sandstones siltstones minor shales.						
10.50	17.50	Quartz Sandstone: Massive to weakly bedded white to light grey, medium grained, well sorted, featureless quartz sandstone. Core badly broken and moderately weathered. Fracture surfaces coated in bitumen. Minor quartz veining.						
17.50	22.20	Bioturbated Sandstone: Light grey to grey fine to medium grained, argillaceous, bioturbated (nodular textured) sandstone. Core moderately weathered and broken with fracture faces coated in oxidised bitumen. Possible bedding of 72° to ca @ 20.8 m. Core recovery 90%.						
22.20	25.00	Nodular Siltstone: Slumpy textured, highly to completely weathered, grey siltstone. Dark grey contorted slumped? intraclasts set within a light grey silty matrix.						
25.00	35.50	CW clayey Siltstone: Dark grey to black, textureless, clayey (soapy feeling) completely weathered siltstone.						
35.50	43.80	Ferruginous Sandstone: Ferruginous, yellow - orange - white, highly to completely weathered, medium grained slumpy? silty quartz sandstone. Minor						

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
35.50	43.80	CON'T: to major component of matrix being silt size. Cavity 38.5-39.0 m.						
		GORDON LIMESTONE - ORDOVICIAN.						
43.80	48.10	CW Pyritic Dolomite: Completely weathered, black and dark grey pyritic, trace galena, massive, textureless argillaceous dol-lutite.	Trace galena and minor pyrite.					
48.10	49.00	CW siltstone: Olive green to beige, completely weathered argillaceous siltstone.						
49.00	53.45	CW Dol-lutite: Black to dark olive green/grey, pyritic massive, to weakly bedded argillaceous completely weathered dol-lutite	Trace pyrite.					
53.45	54.00	CW Sidenitized Acid Volcanic (crystal Tuff): Coarse grained, spotted (Kaolinized feldspar crystals) sidenitized cream to orange-beige volcanic ?? Massive no bedding, uniformly textured.						
		END OF HOLE AS ROD STRING COULD NOT PENETRATE AND WAS REPEATEDLY BOGGED.						

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DRILLHOLE Nº DTSC-84-5A **Page** 1 of 4 **drill log** metric

PROJECT DUNDAS - TASMANIA Nº A84-109		**ELEVATION**		**COMMENCED** 11-9-1984	BORE HOLE SURVEY Eastman Single Shot - BAD Pty Ltd.									
PROSPECT BANNOCKBURN - SUNNY CORNER		**DIP COLLAR** -50		**COMPLETED** 24-9-1984	Depth	Dip	Bearing	Depth	Dip	Bearing	Depth	Dip	Bearing	
CO-ORDINATES 58072 N 65387 E		**CORE SIZE** HQ, NQ		**TOTAL LENGTH** 142 m.	50	50°	210°							
BEARING 221° G 211° M 222° T		**LOGGED BY** P.A. JONES.		MACHINE USED MINDRILL 10L - BADPty LTD	100	51°	210°							
					140	50°	210°							

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
		SILURIAN - CROTTY QUARTZITE											
0.00	8.00	Roller Bit through white moderately weathered sandstone and siltstone.											
8.00	20.00	Quartz Sandstone: Massive, white - grey, medium grained, well sorted qtz sandstone.											
20.00	23.00	Bioturbated Sandstone: Bioturbated, grey - grey/brown, fine to medium grained argillaceous sandstone. Fracture faces coated by oxidised bitumen. Bedding 75° to ca @ 21 metres.											
23.00	25.00	Nodular Siltstone: Slumpy textured, completely weathered, nodular grey argillaceous siltstone. Dark grey contorted slumped intraclasts set within a grey silty matrix.											
25.00	45.00	Roller Bit - through grey clays and minor silty sandstones. GORDON LIMESTONE. contact probably near 40 metre mark with cuttings indicating cw argillaceous dolomite.											
45.00	46.80	Argillaceous Dol-lutite: Completely weathered black - grey, relict layered, argillaceous Dol-lutite. Minor cw dolomite veining.		113312	45	46	1	22	2650	5800	1	30	280
				113313	46	47	1	26	1100	2900	1	1850	260
46.80	48.00	Siltstone Olive-grey-beige, completely weathered,	Trace pyrite.	113314	47	48	1	75	1500	1950	1	600	175

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drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba
46.80	48.00	CON'T: pyritic, argillaceous siltstone.											
48.00	51.50	cw Layered Argillaceous Dol-lutite: Completely weathered grey to black fine grained, argillaceous pyritic (minor disseminated galena) dol-lutite. Minor relict layering – bedding?? heavily disturbed through drilling. Minor interbeds of beige dol-arenites showing brecciated texture with little movement of fragments.	Disseminated Gn as coarsely crystalline cubes and aggregates.	113315	48	49	1	55	2·20%	2·25%	10	1600	135
				113316	49	50	1	20	4700	4850	5	3450	110
				113317	50	51	1	14	1450	7050	1	1550	185
				113318	51	52	1	16	580	2·45%	1	6150	220
51.50	53.60	Dolomitized, Weakly Silicified Breccia: Highly to completely weathered dark brown dolomitized and weakly silicified breccia? with more porous beige dol-arenite fragments set in an extremely fine grained dark brown micritic dolomite matrix. Minor fracture fillings and fossil cast infilling by cream coloured dolomite. Zones within unit predominantly grey brown cw clay zones after dolomite??	Trace gn in dolomite matrix very fine grained	113319	52	53	1	8	1200	1·95%	<1	1·35%	55
				113320	53	54	1	16	5950	2·40%	2	3300	230
53.60	60.50	cw Sideritized Acid Volcanic (Crystal Tuff): In general coarse grained, spotted white (kaolinized feldspar crystals) sideritized, cream to orange-beige volcanic?? Massive with minor interbeds of olive grey massive completely weathered clay (volcanic vitric tuff ??).		113321	54	55	1	38	210	3550	1	3650	210
				113322	55	56	1	85	50	1200	<1	4050	155
				113343	56	57	1	60	22	6050	<1	6650	125
				113344	57	58	1	65	230	1550	<1	6950	165
				113345	58	59	1	48	8	1950	<1	8550	80
				113323	59	60	1	80	26	790	<1	6300	85
				113324	60	61	1	48	330	1650	1	6300	125
60.50	72.80	Interbedded Dol-lutite / Dol-arenite: Highly to completely weathered argillaceous grey Dol-lutites interbedded with grey beige dol-arenites with minor 10-20 cm wide zones showing moderate	62.5-63.5 ≈ 3% Pb-Zn. One to Two metres either side estimated to be 1% Pb-Zn.	113325	61	62	1	34	1·16%	7050	9	2500	210
				113326	62	63	1	100	5·20%	1·70%	22	2400	230
				113327	63	64	1	28	1·17%	7600	9	4050	260
				113328	64	65	1	22	1450	3650	3	1300	370
				113329	65	66	1	22	1700	1400	2	590	340
				113330	66	67	1	18	1200	2850	3	1600	330

Amoco Minerals Australia Company

DRILLHOLE Nº DTSC-84-5A Page 3 of 4

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS Cu	Pb	Zn	Ag	Mn	Ba.
60.50	72.80	CON'T: dolomitization and weak silicification. Clays etc very pyritic with minor to moderate coarse grained galena - sphalerite (pyrite) from 60.5 to 64.00 metres. Core cut by numerous dolomite siderite veins (cw), coarsely crystalline and sphalerite and galena present.		113331	67	68	1	16	860	2250	3	700	230
				113332	68	69	1	14	530	700	1	560	160
				113333	69	70	1	12	840	380	1	4500	160
				113334	70	71	1	14	1650	380	1	530	180
				113335	71	72	1	16	730	420	1	470	180
				113336	72	73	1	24	3150	330	4	440	170
72.80	74.00	Weakly Sideritized CW Acid Volcanic (Crystal Tuff): Coarse grained, spotted white (kaolinized feldspar crystals) weakly siderittic white to cream, completely weathered acid volcanic?? Massive no bedding, uniformly textured. Weakly pyritic as very fine grained disseminations.	Trace pyrite as fine grained disseminations.	113337	73	74	1	210	3000	220	3	170	140
74.00	75.00	Siderittic Veined CW Dolomite: Completely weathered fine grained in part argillaceous black to dark grey siderite veined dolomite. Core very ruddy.		113338	74	75	1	20	4550	1250	3	1100	75
75.00	76.00	Weakly Sideritized CW Acid Volcanic (crystal tuff): As for the previous unit 72.80-74.00m		113339	75	76	1	85	680	340	1	460	135
76.00	111.00	HW Dol-lutite with minor Dolarenite: Highly to completely weathered, extensively broken and ruddy, massive? dark grey, grey and black dol-lutites and minor olive grey dol-arenites. Core recoveries through zone 30-35%. Trace pyrite in dark black dol-lutite. Trace galena 95m.	Trace py in black units. Trace gn at 95m (coarsely crystall- in dissemination)	113340	76	78	2	16	1800	930	1	470	135
				113341	78	79	1	12	260	180	1	250	155
				113342	79	80	1	10	80	200	<1	230	165
111.00	120.00	Highly Fossiliferous Calc-lutite minor Dol-lutite: Sequence of highly weathered to fresh											

Amoco Minerals Australia Company

DRILLHOLE Nº DTSC-84-5A Page 4 of 4

drill log metric

METERAGE From	METERAGE To	DESCRIPTION	MINERALIZATION	SAMPLE Nº	METERAGE From	METERAGE To	METERAGE Length	ASSAYS
111.00	120.00	CONT: highly fossiliferous (corallinè debris, stromatoporoid fragments, oncalites – up to 2cm diam. and intraclasts – up to 1.5 cm diam) heavily stylolitized and micro and macro faulted, calclutites interbedded with massive dark grey to black fossiliferous (corallinè fragments – very calcareous) argillaceous fine grained dol-lutite. NIL Recoveries 116 – 120.00 metres CAVITY.						
120.00	134.50	Dolomitized Carbonate: Dark grey, heavily dolomitized and later dolomite veined (finely crystalline cream white crystals) possible more massive carbonate? NO original textures are observable. Dolomite veins < 1mm width core extensively broken, with many rubbly sections.						
HQ to NQ @ 120 m.								
134.50	142.00	Interbedded Calc-lutite / Calc-arenite/ Dol-lutite: Completely weathered silty zone from 134.50 to 137.20. Rest being fresh, light grey weakly fossiliferous (shelly, oncalites and intraclasts) calc-lutites interbedded (contacts slumpy and deformed) with darker grey weakly dolomitized calc-arenites and with darker grey to black argillaceous pyritic massive fine grained primary dolomite. Core cut by numerous fine calcite veins and veinlets. Core heavily stylolitized.						
		END OF HOLE 142.00 metres.						

115121

APPENDIX 2

DIAMOND DRILL SECTIONS - DTBJ-84-1 AND 2, DTM-84-1 TO 9,
DTB-84-1/1A AND DTSC-84-1 TO 5A

120

67200 E

67300 E

67400 E

2m of 0.1 % Pb, 1.1 % Zn, 3.0 g/t Ag

16m of 0.2 % Pb, 1.9 % Zn, 4.3 g/t Ag
incl. 4m of 0.4 % Pb, 5.0 % Zn, 8.0 g/t Ag
Laminated limestone, 5-10 % sphalerite, ↗ 145/85° W

Coral fossil breccia in costean, ↗ 160/70° W

DTBJ-84-1

Sc

CW Og1

Og 2

Og 3

Og 2

bioclastic

bioclastic

Og 2a bioclastic

Og 3

Og 2

bioclastic Og 2
Og 2a
bioclastic Og 2

Og2a

SO

slumped

Og 9

T.D. 102.5m

100

Og 9
Og 2a

Og 2

*Note: Hole not surveyed, caved at 30m
Assume dip steepened to 45° by 102.5m

Legend

115122

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Limestone . . . . . Og 1 35
Calc-lutite to calc-arenite 2 34
Dol-lutite to dol-arenite (primary) 2a 30
Pisolitic dolomite / limestone 3 26
Medium to coarsely crystalline dolomite (secondary) . . . . . 4 Interbedded calc-lutite + dol-lutite
Calcite-dolomite veined breccia (hydrothermal) 5 29
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite) 6 12
Finely laminated calc-lutite and dol-lutite 7 14
Fossil or slump breccia 8 37
Chaotic breccia 46
Calcareous quartz sandstone 41
Calcite / siderite / dolomite veins 9 58
Ca/Sd/Do

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay . . CW
Cavity
Silicification
Karst fill . . . . . k

Vein - orientation unknown
Vein - orientation known
Unconformity
Bedding to core axis angle CA

Amoco Minerals Australia Company

Amoco/CSR Joint Venture
Exploration Licence 15/76

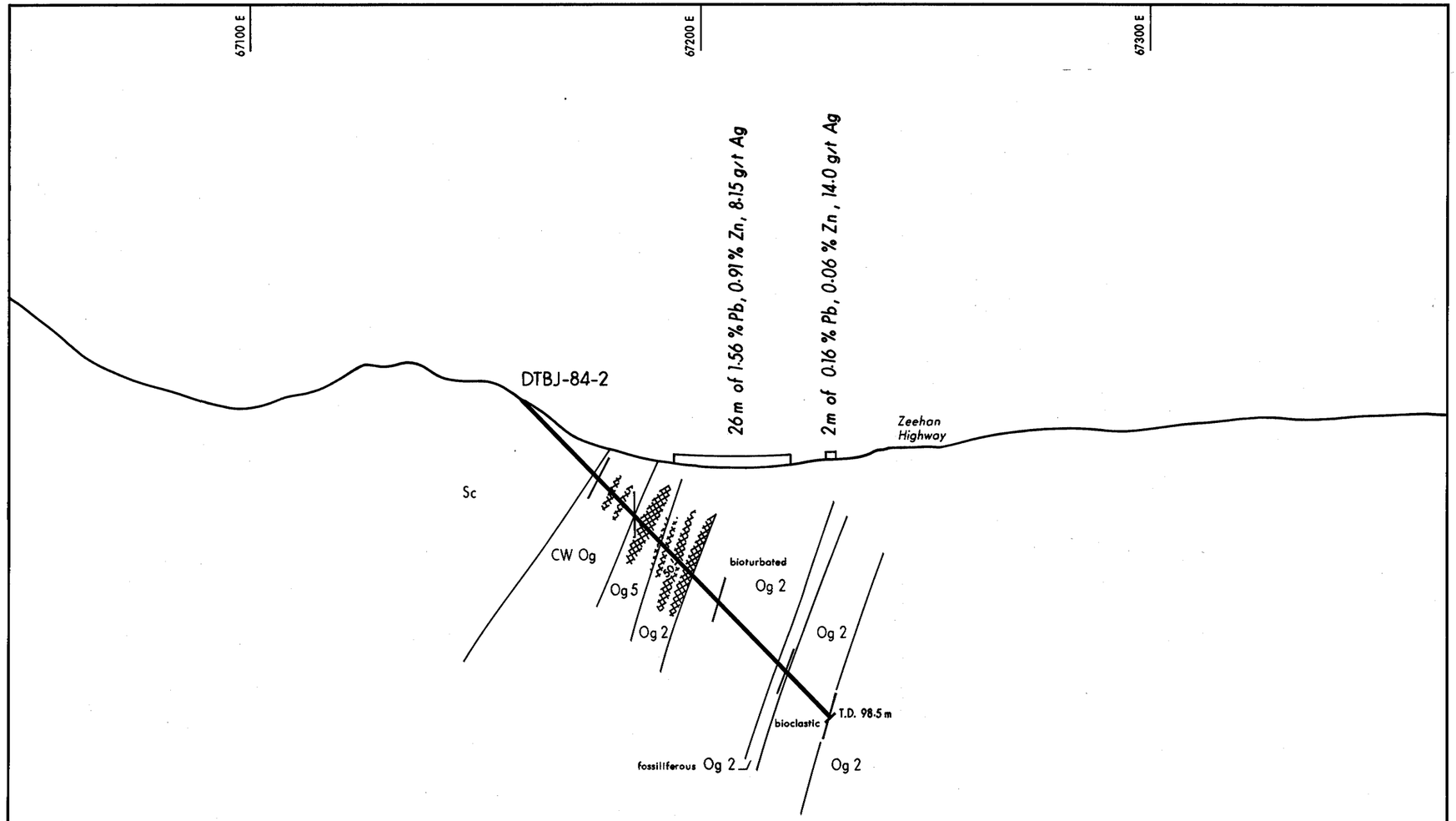
5 cm

Black Jacks

CROSS SECTION 60830 N
DRILLHOLE DTBJ-84-1

Scale: V=H 1:1000

121



Legend

115123

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Og

Limestone	1	33
Calc-lutite to calc-arenite	2	34
Dol-lutite to dol-arenite (primary) (interbedded calc-lutite + dol-lutite)	2a	30
Pisolitic dolomite / limestone	3	26
Medium to coarsely crystalline dolomite (secondary)	4	
Calcite-dolomite veined breccia (hydrothermal)	5	29
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite)	6	12
Finely laminated calc-lutite and dol-lutite	7	14
Fossil or slump breccia	8	37
Chaotic breccia		46
Calcareous quartz sandstone		41
Calcite / siderite / dolomite veins	9	58
	Ca/Sd/Do	

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay	CW	*Vein - orientation unknown*	
Cavity		*Vein - orientation known*	
Silicification		*Unconformity*	
Karst fill	k	*Bedding to core axis angle*	CA

Amoco Minerals Australia Company

Amoco/CSR Joint Venture
Exploration Licence 15/76

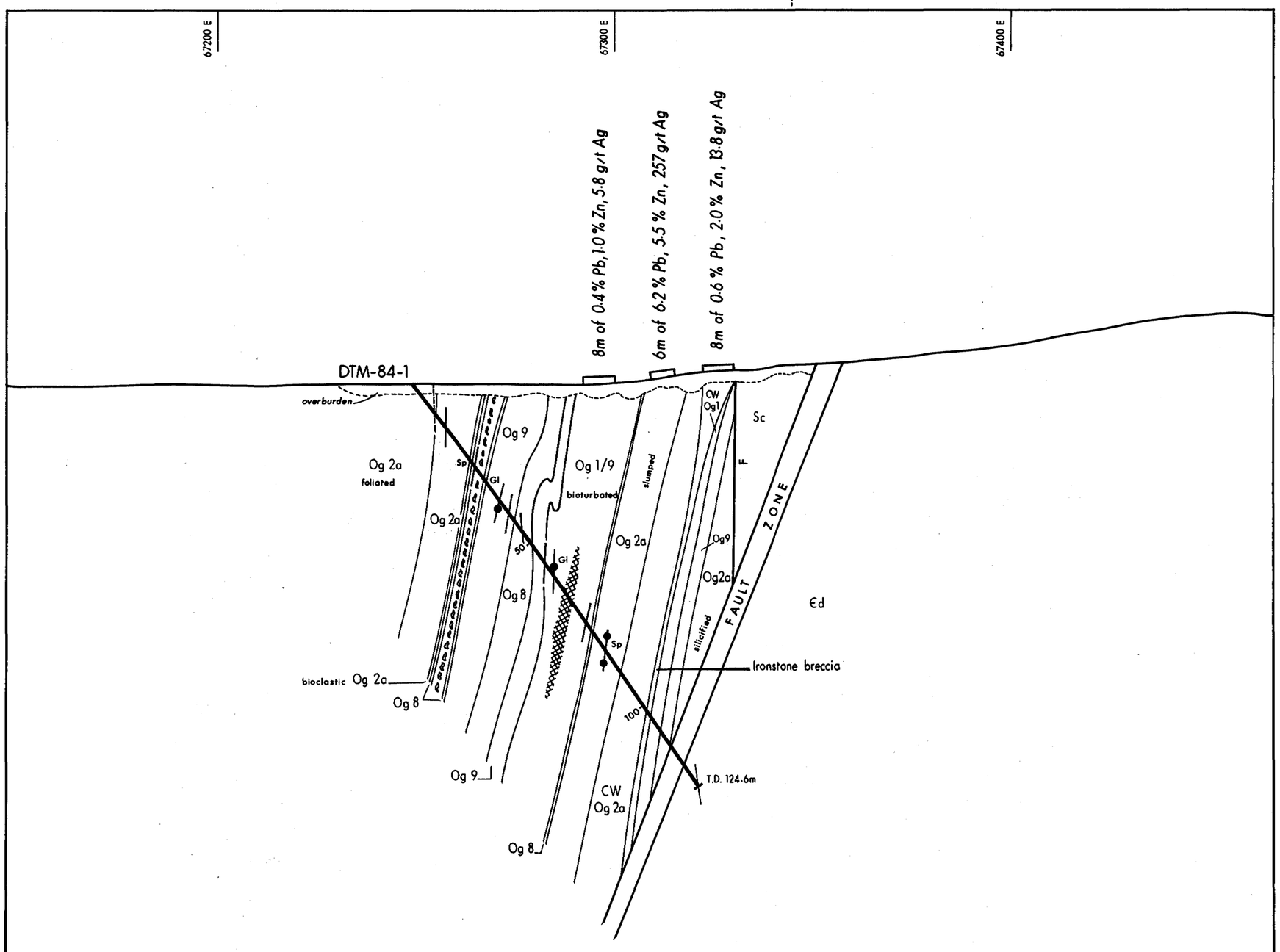
5 cm

Black Jacks

CROSS SECTION 61050 N
DRILLHOLE DTBJ-84-2

Scale: V=H 1:1000

122



Legend

115124

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Limestone 33
Calc-lutite to calc-arenite 34
Dol-lutite to dol-arenite (primary) 30
Pisolitic dolomite / limestone 26
Medium to coarsely crystalline dolomite (secondary) 29
Calcite-dolomite veined breccia (hydrothermal) 12
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite) 14
Finely laminated calc-lutite and dol-lutite 37
Fossil or slump breccia 46
Chaotic breccia 41
Calcareous quartz sandstone 58
Calcite / siderite / dolomite veins . . . . . Ca/Sd/Do

Og: 1, 2, 2a, 3, 4, 5, 6, 7, 8, 9 (interbedded calc-lutite + dol-lutite)

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay . . CW		Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill . . . . . k		Bedding to core axis angle	CA

Amoco Minerals Australia Company

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Exploration Licence 15/76

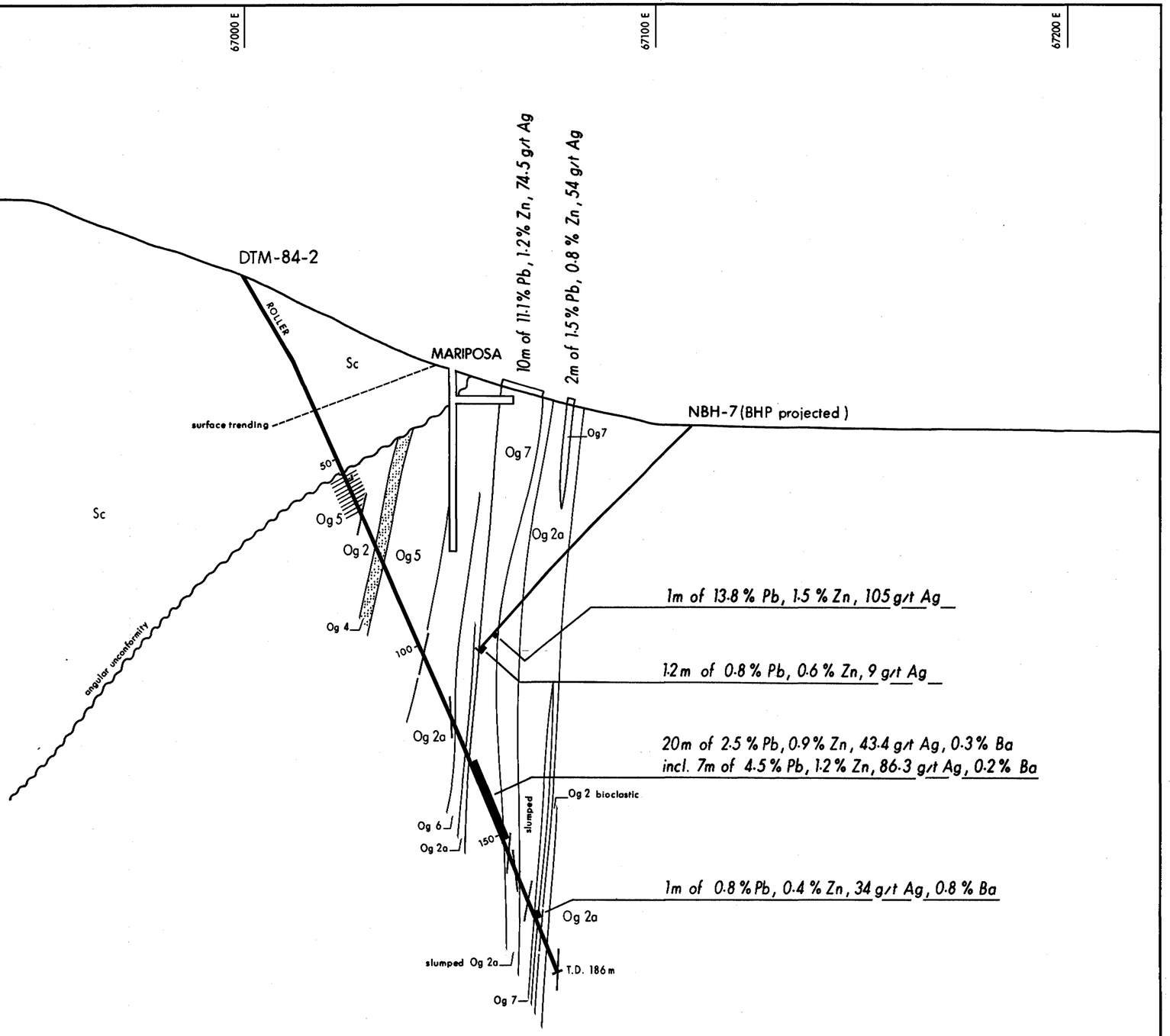
5 cm

Mariposa

CROSS SECTION 58800 N
DRILLHOLE DTM-84-1

Scale: V = H 1:1000

123



Legend

115125

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Og

Limestone	1	35
Calc-lutite to calc-arenite	2	34
Dol-lutite to dol-arenite (primary)	2a / 3 (interbedded calc-lutite + dol-lutite)	30 / 28
Pisolitic dolomite / limestone	4	
Medium to coarsely crystalline dolomite (secondary)	5	29
Calcite-dolomite veined breccia (hydrothermal)	6	12
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite)	7	14
Finely laminated calc-lutite and dol-lutite	8	37
Fossil or slump breccia		46
Chaotic breccia		41
Calcareous quartz sandstone	9	58
Calcite / siderite / dolomite veins	Ca/Sd/Do	

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay	CW	Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill	k	Bedding to core axis angle	CA

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Exploration Licence 15/76

5 cm

Mariposa

CROSS SECTION 58950 N
DRILLHOLE DTM-84-2

Scale: V = H 1:1000

124

67200 E

67300 E

67400 E

12m of 2.0 % Pb, 1.2 % Zn, 65.6 g/t Ag

2m of 0.2% Pb, 1.8 % Zn

*Projected 15m from S

DTM-84-3

overburden

Og 9
silicified
dolomitized

FAULT ZONE

Og 2a
slumped

Ed

3m of 0.6 % Pb, 0.2% Zn, 36 g/t Ag

3m of 0.2% Pb, 1.4% Zn, 5 g/t Ag

Og 7

Og 5

Og 8

Og 2a
Og 8

50°

T.D. 70 m

Legend

115126

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Limestone . . . . . Og 1 33

Calc-lutite to calc-arenite 2 34

Dol-lutite to dol-arenite (primary) . . . . . Interbedded calc-lutite + dol-lutite 2a 30

Pisolitic dolomite / limestone 3 26

Medium to coarsely crystalline dolomite (secondary) 4

Calcite-dolomite veined breccia (hydrothermal) 5 29

Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite) 6 12

Finely laminated calc-lutite and dol-lutite 7 14

Fossil or slump breccia 8 37

Chaotic breccia 46

Calcareous quartz sandstone 41

Calcite / siderite / dolomite veins 9 58

Ca/Sd/Do

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay . . CW		Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill . . . . . k		Bedding to core axis angle	CA

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Exploration Licence 15/76

5 cm

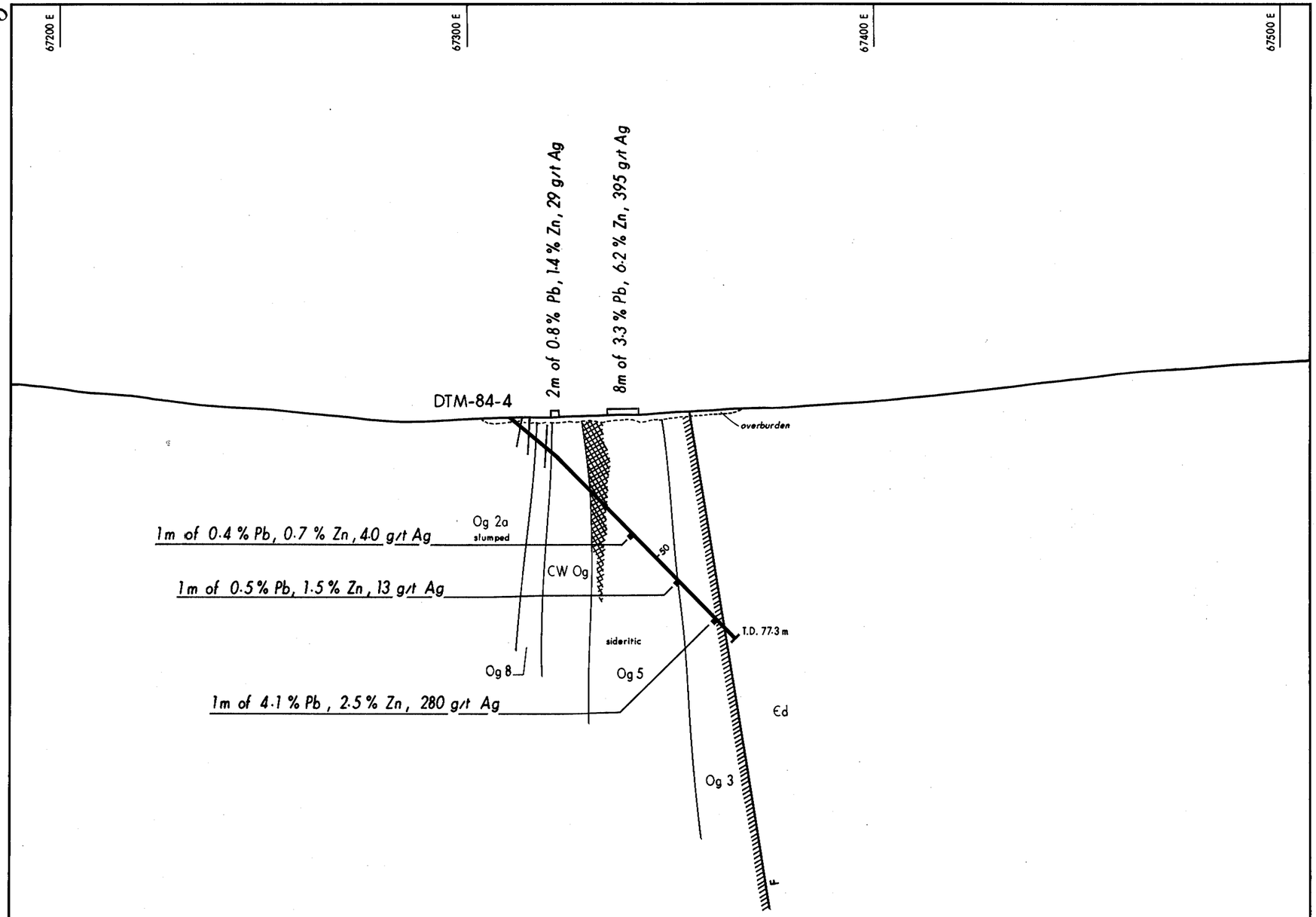
Mariposa

CROSS SECTION 58835 N

DRILLHOLE DTM-84-3

Scale: V=H 1:1000

125



Legend

115127

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Limestone 33
Calc-lutite to calc-arenite 34
Dol-lutite to dol-arenite (primary) 30
Pisolitic dolomite / limestone 26
Medium to coarsely crystalline dolomite (secondary) 29
Calcite-dolomite veined breccia (hydrothermal) 12
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite) 14
Finely laminated calc-lutite and dol-lutite 37
Fossil or slump breccia 46
Chaotic breccia 41
Calcareous quartz sandstone 58
Calcite / siderite / dolomite veins . . . . . Og 1 2 2a 3 4 5 6 7 8 9 Cal/Sd/Do

Interbedded calc-lutite + dol-lutite

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay	CW	Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill	k	Bedding to core axis angle	CA

Amoco Minerals Australia Company

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Exploration Licence 15/76

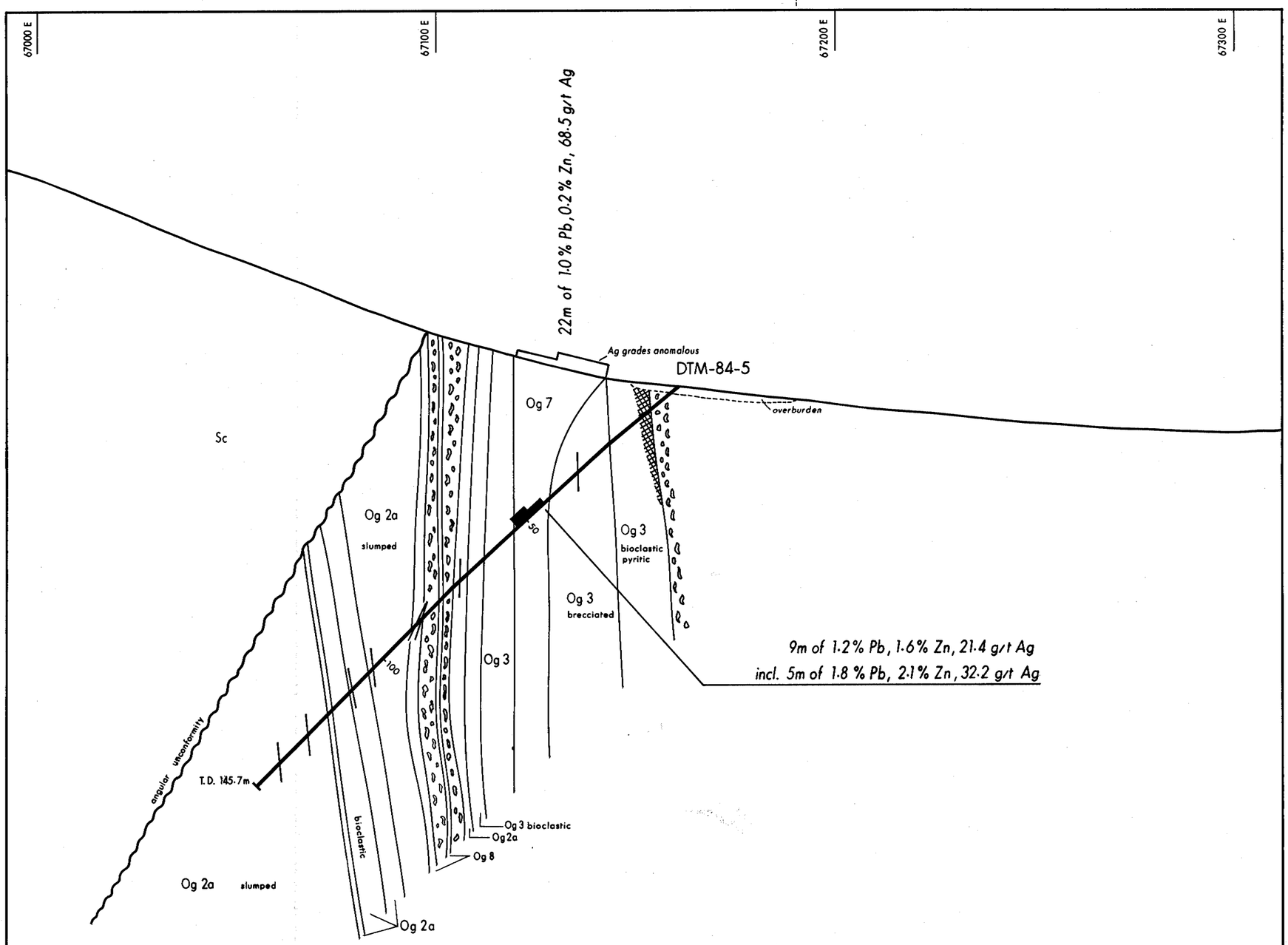
5 cm

Mariposa

CROSS SECTION 59193 N
DRILLHOLE DTM-84-4

Scale: V=H 1:1000

126



Legend

115128

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Og 1 35
2 34
2a 30
3 26
4
5 29
6 12
7 14
8 37
9 58

Limestone 1
Calc-lutite to calc-arenite 2
Interbedded calc-lutite + dol-lutite 2a
Dol-lutite to dol-arenite (primary) 3
Pisolitic dolomite / limestone 4
Medium to coarsely crystalline dolomite (secondary) 5
Calcite-dolomite veined breccia (hydrothermal) 6
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite) 7
Finely laminated calc-lutite and dol-lutite 8
Fossil or slump breccia 9
Chaotic breccia . . . . . Co/Sd/Do
Calcareous quartz sandstone . . . . .
Calcite / siderite / dolomite veins . . . . .

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay	CW	*Veiin - orientation unknown*	
Cavity		*Veiin - orientation known*	
Silicification		*Unconformity*	
Karst fill	k	*Bedding to core axis angle*	CA

Amoco Minerals Australia Company

Amoco/CSR Joint Venture
Exploration Licence 15/76

5 cm

Mariposa

CROSS SECTION 59200 N
DRILLHOLE DTM-84-5

Scale: V=H 1:1000

127

115129

67000 E

67100 E

67200 E

Costean projected from L 59100 N

2m of 1.8 % Pb, 0.4 % Zn, 12 g/t Ag

no access to west

*approximate width of mineralization projected from drillhole NBH 4 22m S of section

DTM-84-6

siltstone fossil

Sc

Og 2a

angular unconformity

Og 2

fossiliferous

Og 2a bioclastic

Og 2a

Og 2

Og 2a

Og 2

Og 2a

Og 8

100

150

Og 4

Og 5

8m of 3.0 % Pb, 0.4 % Zn, 44.8 g/t Ag, 0.5 % Ba

Og 3

200

Og 7

Og 6

T.D. 238 m

Og 5

Legend

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Limestone	Og 1	33
Calc-lutite to calc-arenite	2	34
Dol-lutite to dol-arenite (primary) (interbedded calc-lutite + dol-lutite)	2a	30
Pisolitic dolomite / limestone	3	28
Medium to coarsely crystalline dolomite (secondary)	4	
Calcite-dolomite veined breccia (hydrothermal)	5	29
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite)	6	12
Finely laminated calc-lutite and dol-lutite	7	14
Fossil or slump breccia	8	37
Chaotic breccia		46
Calcareous quartz sandstone		41
Calcite / siderite / dolomite veins	9	58
	Ca/Sd/Do	

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay	CW	Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill	k	Bedding to core axis angle	CA

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Exploration Licence 15/76

5 cm

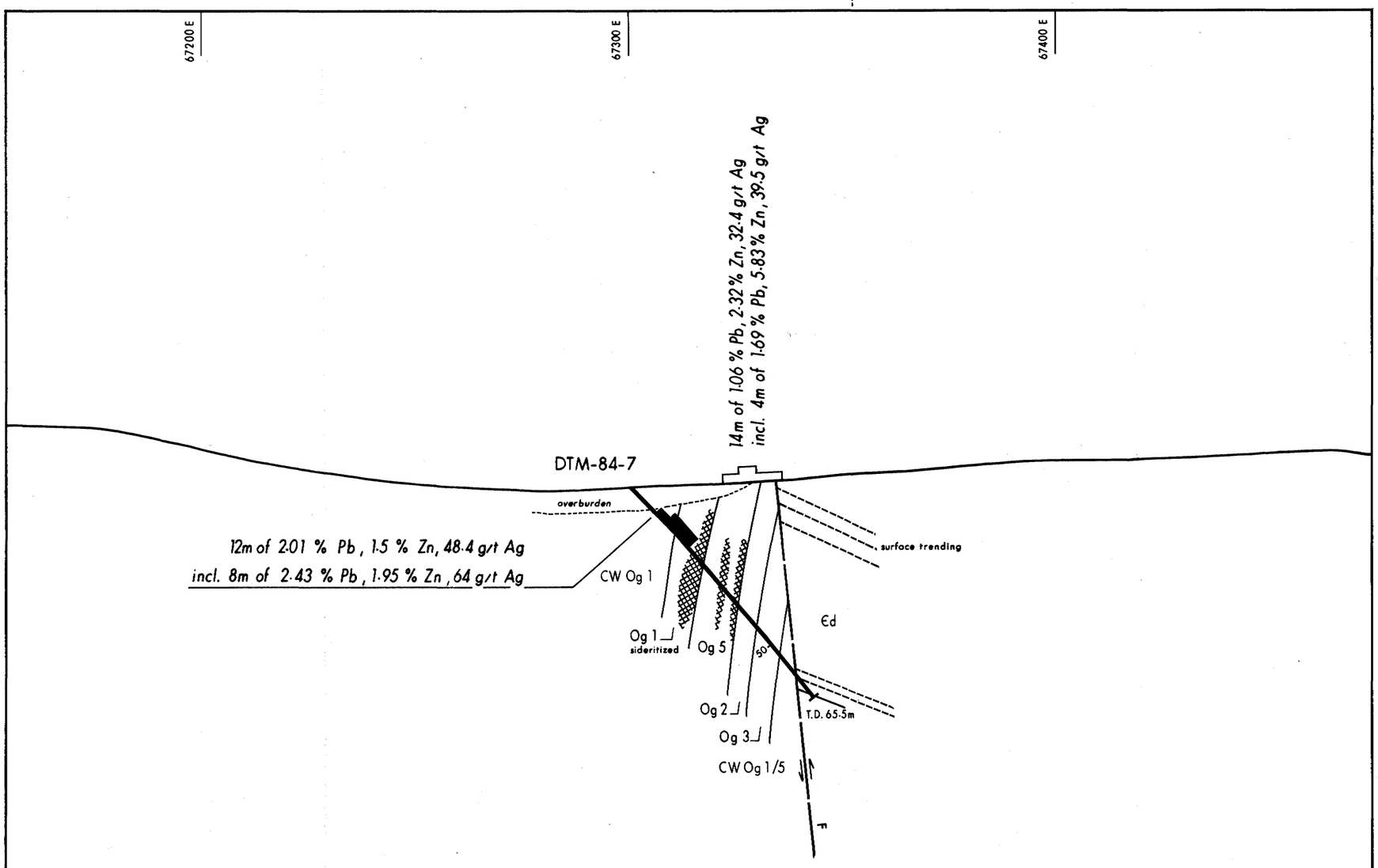
Mariposa

CROSS SECTION 59075 N
DRILLHOLE DTM-84-6

Scale: V=H 1:1000

128

115130



Legend

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Limestone	Og 1	33
Calc-lutite to calc-arenite	2	34
Dol-lutite to dol-arenite (primary)	2a (interbedded calc-lutite + dol-lutite)	30
Pisolitic dolomite / limestone	3	26
Medium to coarsely crystalline dolomite (secondary)	4	
Calcite-dolomite veined breccia (hydrothermal)	5	29
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite)	6	12
Finely laminated calc-lutite and dol-lutite	7	14
Fossil or slump breccia	8	37
Chaotic breccia	9	46
Calcareous quartz sandstone		41
Calcite / siderite / dolomite veins	Ca/Sd/Do	58

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay . . CW		Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill . . . . . k		Bedding to core axis angle	CA

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Amoco/CSR Joint Venture
Exploration Licence 15/76

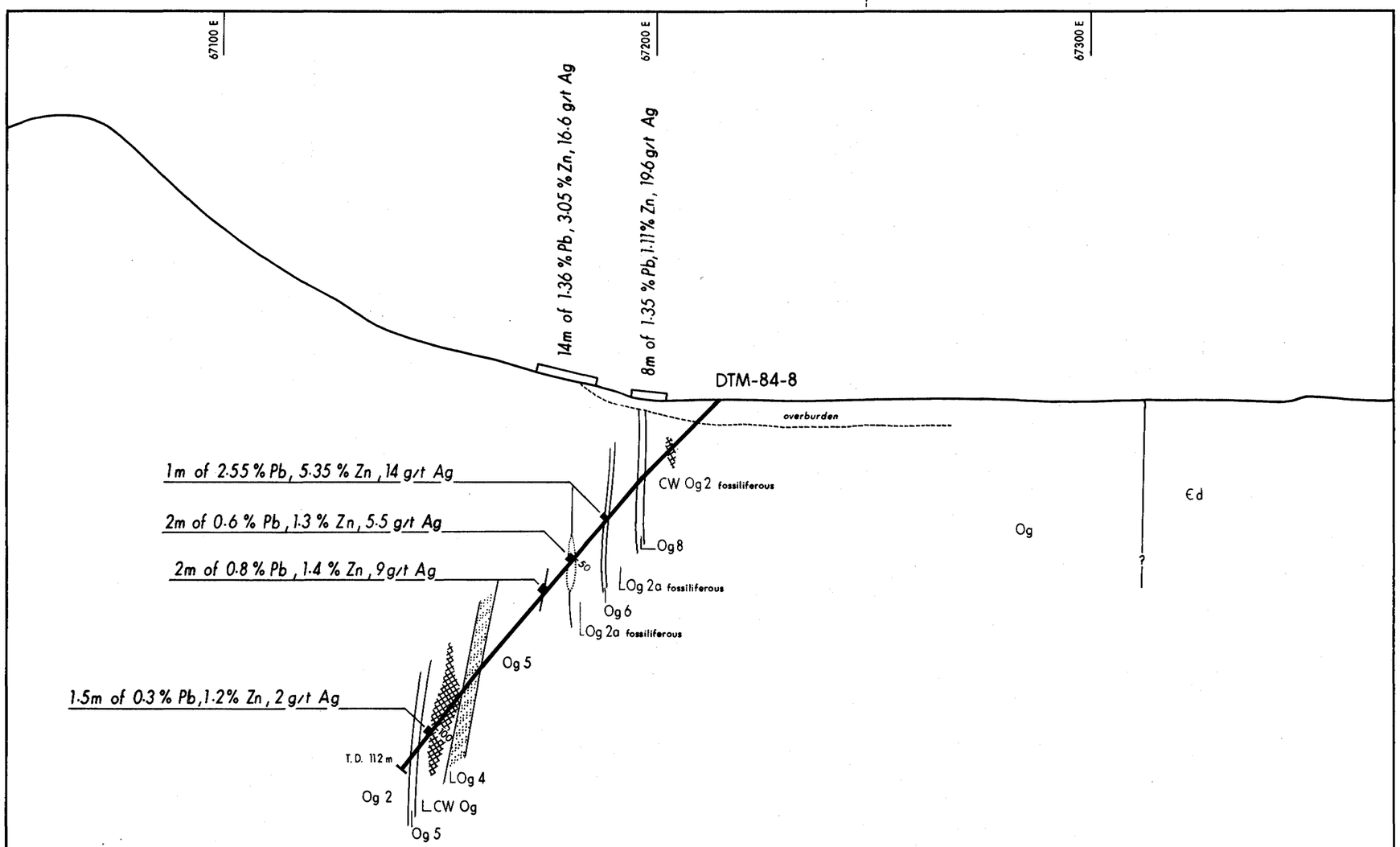
5 cm

Mariposa

CROSS SECTION 59419 N
DRILLHOLE DTM-84-7

Scale: V=H 1:1000

129



Legend

115131

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Og

Limestone	1	33
Calc-lutite to calc-arenite	2	34
Dol-lutite to dol-arenite (primary)	2a (Interbedded calc-lutite + dol-lutite)	30
Pisolitic dolomite / limestone	3	28
Medium to coarsely crystalline dolomite (secondary)	4	
Calcite-dolomite veined breccia (hydrothermal)	5	29
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite)	6	12
Finely laminated calc-lutite and dol-lutite	7	14
Fossil or slump breccia	8	37
Chaotic breccia	9	46
Calcareous quartz sandstone		41
Calcite / siderite / dolomite veins	Ca/Sd/Do	58

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Cd 64

Symbols

Weathered to clay	CW	Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill	k	Bedding to core axis angle	CA

Amoco Minerals Australia Company

Amoco/CSR Joint Venture
Exploration Licence 15/76

5 cm

Mariposa

CROSS SECTION 59600 N
DRILLHOLE DTM-84-8

Scale: V=H 1:1000

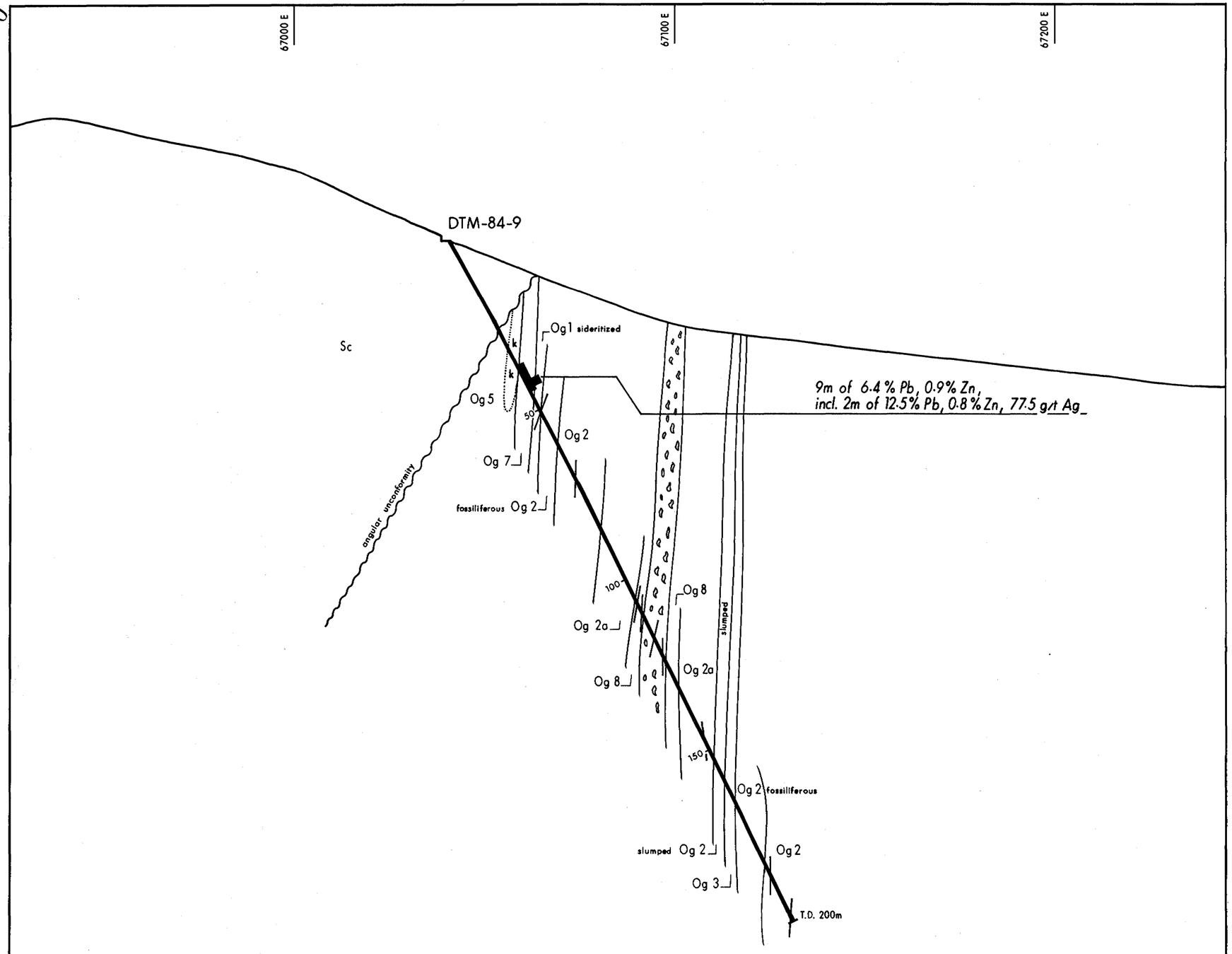
130

115132

67000 E

67100 E

67200 E



Legend

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Og

Limestone	1	35
Calc-lutite to calc-arenite	2	34
Dol-lutite to dol-arenite (primary)	2a (interbedded calc-lutite + dol-lutite)	30
Pisolitic dolomite / limestone	3	28
Medium to coarsely crystalline dolomite (secondary)	4	
Calcite-dolomite veined breccia (hydrothermal)	5	29
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite)	6	12
Finely laminated calc-lutite and dol-lutite	7	14
Fossil or slump breccia	8	37
Chaotic breccia		46
Calcareous quartz sandstone		41
Calcite / siderite / dolomite veins	9	58
	Ca/Sd/Do	

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay	CW	Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill	k	Bedding to core axis angle	CA

Amoco Minerals Australia Company

Amoco/CSR Joint Venture
Exploration Licence 15/76

5 cm

Mariposa

CROSS SECTION 59158 N

DRILLHOLE DTM-84-9

Scale: V=H 1:1000

131

115133

65700 E

65800 E

65900 E

6m of 1.1% Pb, 0.4% Zn, 5.8 g/t Ag

26m of 1.8% Pb, 0.8% Zn, 10.8 g/t Ag

2m of 1.0% Pb, 1.2% Zn, 7.5 g/t Ag

DTB-84-1A

DTB-84-1

ROLLER

50

Sc

Og 5

CW Og 5 ?

Sc

Gl,Sp

T.D. 101.5m

Og 6

100

Gl

Gl,Sp

Sp

CW Og 5 ?

Og 2a

FAULT ZONE

POOR GROUND CONDITIONS

150

Og 3

Og 8

bioclastic, variably slumped

Og 2a

200

T.D. 212.7m

Legend

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Limestone	Og 1	33
Calc-lutite to calc-arenite	2	34
Dol-lutite to dol-arenite (primary)	2a (interbedded calc-lutite + dol-lutite)	30
Pisolitic dolomite / limestone	3	26
Medium to coarsely crystalline dolomite (secondary)	4	
Calcite-dolomite veined breccia (hydrothermal)	5	29
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite)	6	12
Finely laminated calc-lutite and dol-lutite	7	14
Fossil or slump breccia	8	37
Chaotic breccia	9	46
Calcareous quartz sandstone		41
Calcite / siderite / dolomite veins	Ca/Sd/Do	58

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay . . CW	Vein - orientation unknown
Cavity	Vein - orientation known
Silicification	Unconformity
Karst fill . . . . . k	Bedding to core axis angle CA

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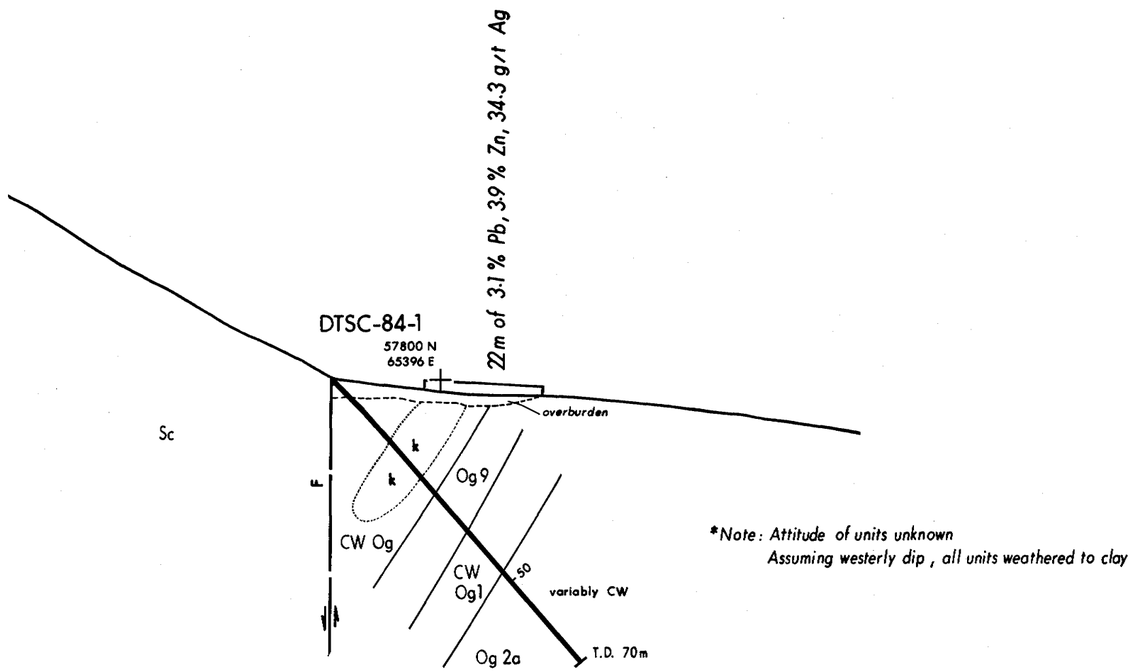
5 cm

Bannockburn

CROSS SECTION 56900 N
DRILLHOLES DTB-84-1,1A

Scale: V=H 1:1000

132



*Note: Attitude of units unknown
Assuming westerly dip, all units weathered to clay

115134

Legend

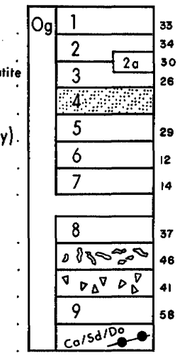
SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone



Limestone 35
Calc-lutite to calc-arenite 34
Dol-lutite to dol-arenite (primary) 30
Pisolitic dolomite / limestone 26
Medium to coarsely crystalline dolomite (secondary) 29
Calcite-dolomite veined breccia (hydrothermal) 12
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite) 14
Finely laminated calc-lutite and dol-lutite 37
Fossil or slump breccia 46
Chaotic breccia 41
Calcareous quartz sandstone 58
Calcite / siderite / dolomite veins 58

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay . . CW		Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill . . . . . k		Bedding to core axis angle	CA

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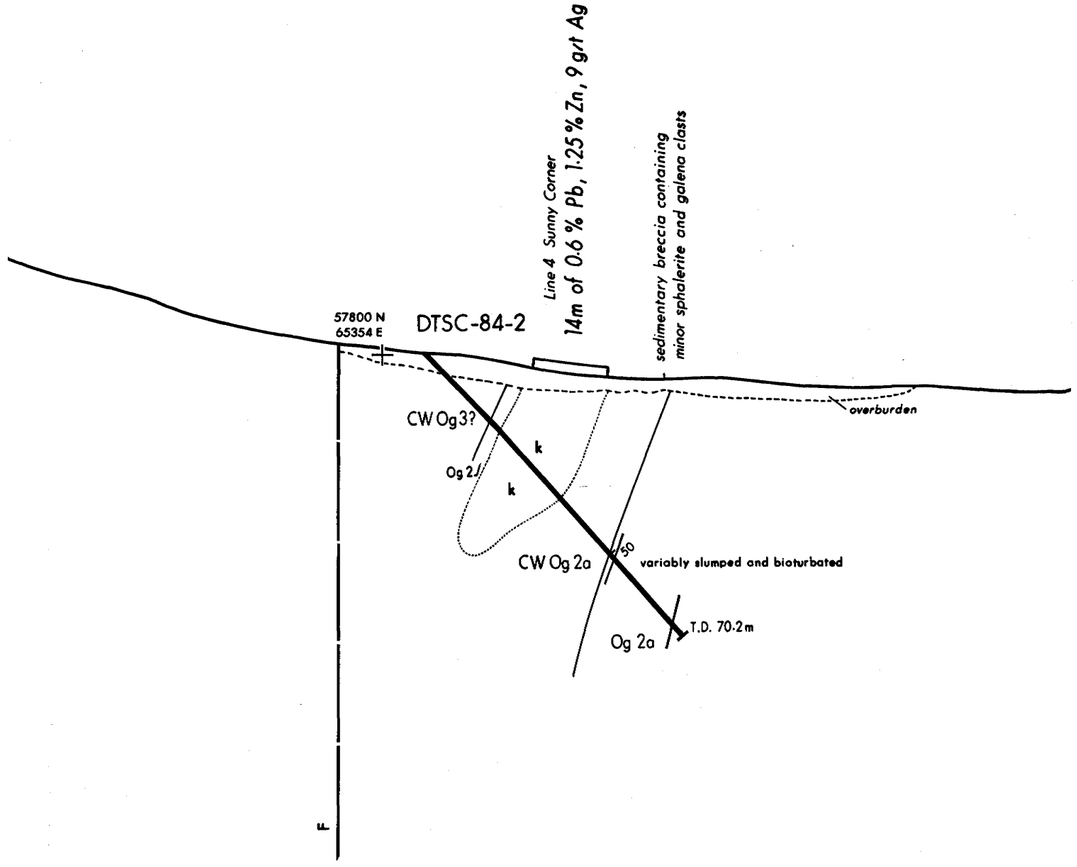
Bannockburn (Sunny Corner)

CROSS SECTION
DRILLHOLE DTSC-84-1

Scale: V=H 1:1000

5 cm

133



Legend

115135

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Limestone . . . . . Og 1 35
Calc-lutite to calc-arenite 2 34
Dol-lutite to dol-arenite (primary) . . . . . 2a Interbedded calc-lutite + dol-lutite 30
Pisolitic dolomite / limestone 3 28
Medium to coarsely crystalline dolomite (secondary) 4 29
Calcite-dolomite veined breccia (hydrothermal) 5 12
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite) 6 14
Finely laminated calc-lutite and dol-lutite 7 37
Fossil or slump breccia 8 46
Chaotic breccia 9 41
Calcareous quartz sandstone 58
Calcite / siderite / dolomite veins . . . . . Ca/Sd/Do

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . €d 64

Symbols

Weathered to clay . . CW		Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill . . . . . k		Bedding to core axis angle	CA

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Bannockburn (Sunny Corner)

CROSS SECTION
DRILLHOLE DTSC-84-2

Scale: V=H 1:1000

5 cm

134

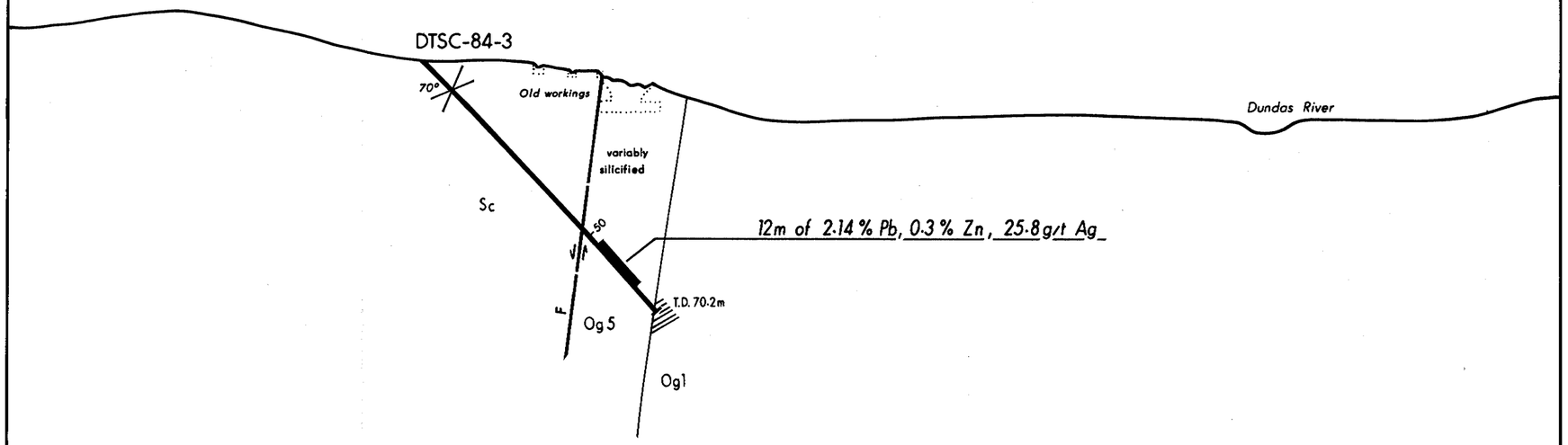
115136

65800 E

65900 E

66000 E

66100 E



Legend

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Og

Limestone	1	33
Calc-lutite to calc-arenite	2	34
Interbedded calc-lutite + dol-lutite	2a	30
Dol-lutite to dol-arenite (primary)	3	26
Pisolitic dolomite / limestone	4	
Medium to coarsely crystalline dolomite (secondary)	5	29
Calcite-dolomite veined breccia (hydrothermal)	6	12
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite)	7	14
Finely laminated calc-lutite and dol-lutite	8	37
Fossil or slump breccia		46
Chaotic breccia		41
Calcareous quartz sandstone	9	58
Calcite / siderite / dolomite veins	Ca/Sd/Do	

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay	CW	Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill	k	Bedding to core axis angle	CA

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Bannockburn (Sunny Corner)

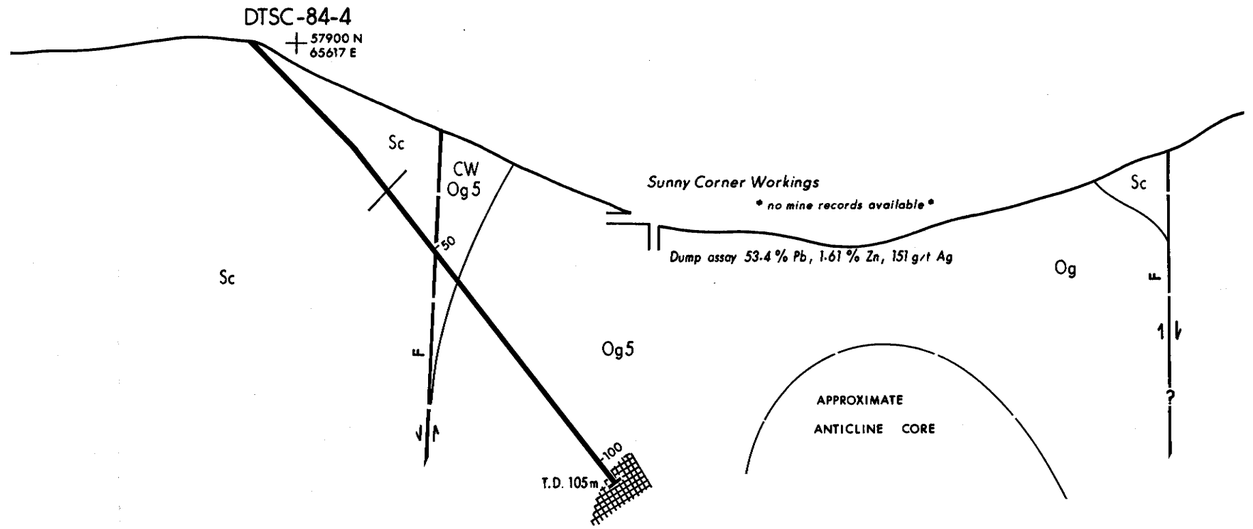
CROSS SECTION 57800 N
DRILLHOLE DTSC-84-3

Scale: V = H 1:1000

5 cm

135

115137



Legend

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Og

Limestone	1	35
Calc-lutite to calc-arenite	2	34
Dol-lutite to dol-arenite (primary)	2a (interbedded calc-lutite + dol-lutite)	30
Pisolitic dolomite / limestone	3	26
Medium to coarsely crystalline dolomite (secondary)	4	
Calcite-dolomite veined breccia (hydrothermal)	5	29
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite)	6	12
Finely laminated calc-lutite and dol-lutite	7	14
Fossil or slump breccia	8	37
Chaotic breccia	9	46
Calcareous quartz sandstone		41
Calcite / siderite / dolomite veins	Ca/Sd/Do	58

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay	CW	Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill	k	Bedding to core axis angle	CA

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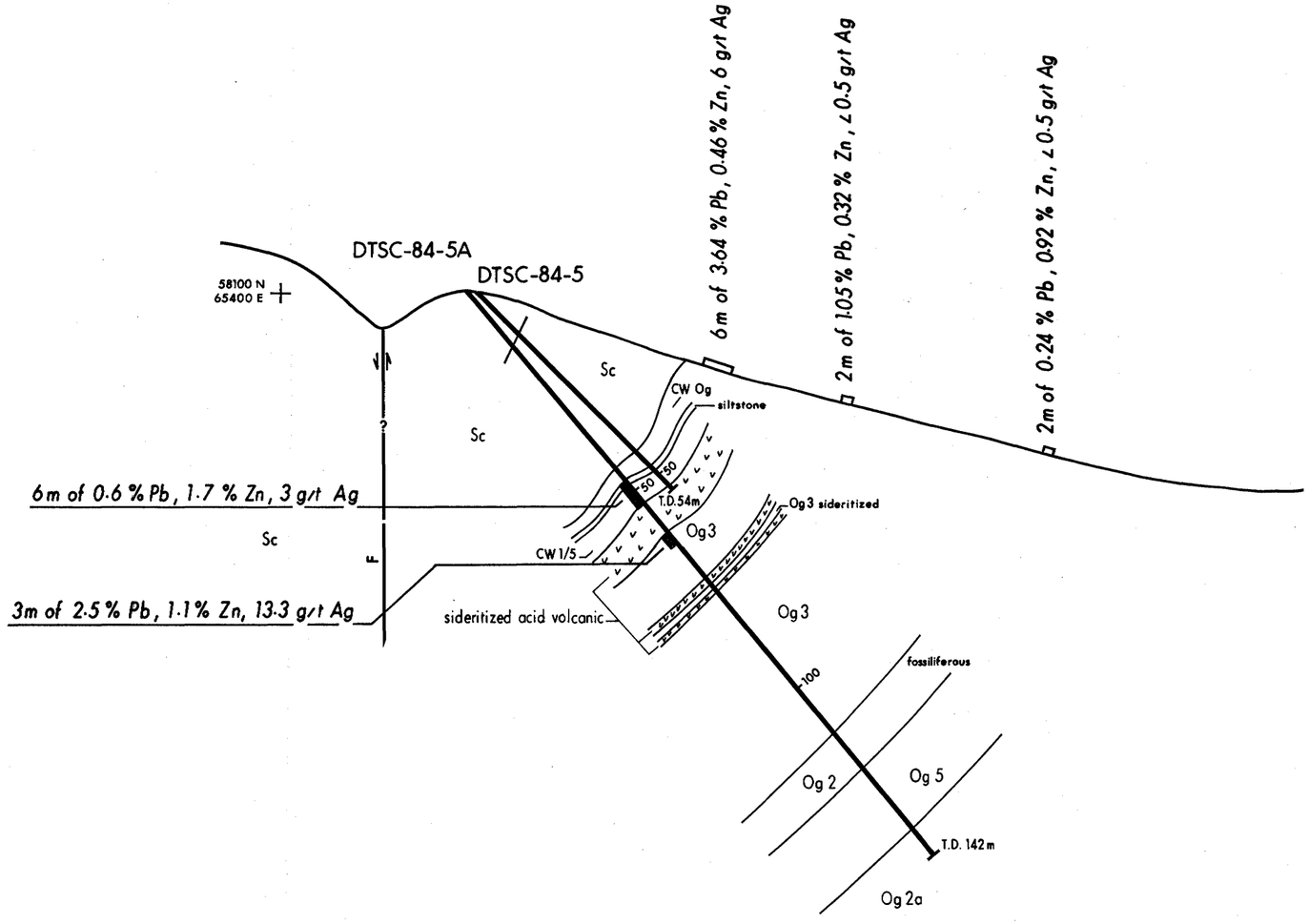
Bannockburn (Sunny Corner)

CROSS SECTION
DRILLHOLE DTSC-84-4

Scale: V=H 1:1000

5 cm

136



Legend

115138

SILURIAN

Crotty Quartzite

Sandstone, siltstone, minor shale . . . . . Sc 2

ORDOVICIAN

Gordon Limestone

Limestone	Og 1	33
Calc-lutite to calc-arenite	2	34
Dol-lutite to dol-arenite (primary) Interbedded calc-lutite + dol-lutite	2a	30
Pisolitic dolomite / limestone	3	26
Medium to coarsely crystalline dolomite (secondary)	4	
Calcite-dolomite veined breccia (hydrothermal)	5	29
Mineralized horizon (galena-sphalerite-barite-siderite-dolomite-calcite)	6	12
Finely laminated calc-lutite and dol-lutite	7	14
Fossil or slump breccia	8	37
Chaotic breccia	9	46
Calcareous quartz sandstone		41
Calcite / siderite / dolomite veins	Ca/Sd/Do	58

CAMBRIAN

Dundas Formation

Variably hematitic volcaniclastic shales, siltstones and minor conglomerates . . . . . Ed 64

Symbols

Weathered to clay	CW	Vein - orientation unknown	
Cavity		Vein - orientation known	
Silicification		Unconformity	
Karst fill	k	Bedding to core axis angle	CA

Amoco Minerals Australia Company

Amoco/CSR Joint Venture
Exploration Licence 15/76

Bannockburn (Sunny Corner)

CROSS SECTION
DRILLHOLES DTSC-84-5,5A

Scale: V=H 1:1000

5 cm

115139

APPENDIX 3

GAMMA LOGS

by Mitre Geophysics

Mariposa #1 18/12/84

GAMMA

0m

MARIPOSA # 1
DTM - 84 - 1
0 - 100 CPS
1 : 200 SCALE
TC = 2 SEC's
NITRE G.
18 · 12 · 84

Logging Spd = 6m/min

10m

20m

30m

40m

50m

60m

70m

80m

90m

100m

110m

MARIPOSA #3
DTM - 84 - 3
0 - 100 CPS
1 : 200 SCALE
TC = 2 SEC's
NITRE G.
18 · 12 · 84

0 - 100 cps

TC = 2

GAMMA LOG

10m

20m

30m

40m

100 cps

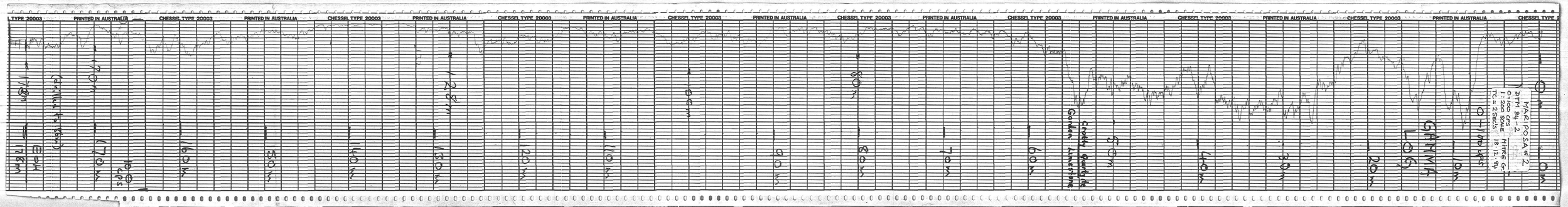
50m

55m

EOH 55m

(drilled to 70m)

5 cm


CHESSEL TYPE 20003
PRINTED IN AUSTRALIA
5 cm
MARIPOSA #2
DITH 84-2
0-100 CPS
1:200 SCALE
TIME C-1
18-12-84
TC = 2.86 CLS
OUTWATERS
GAMMA LOG
Golden Limestone
Rocky Gravelly
(Rocky Gravelly)
Sandy
Silty
Clay
Sand
Gravel
Rock
Limestone
Shale
Coal
Salt
Water
Oil
Gas
Ore
Coal
Salt
Water
Oil
Gas
Ore

MARIPOSA # 4
DTM-84-4
0-100 CPS
1:200 SCALE
TC = 2SEC's
MITRE G.
19·12·84

-10m
Memp
On 100 cps
1:200

-10m
GAMMA
LOG

Two 20m

-30m

-40m

-50m

-60m

100cps

-70m

Gordon Limestone
Dundas Group

77m EOH
(Drilled 77.3m)

5 cm

19/12/84

MARIPOSA #5
DTM-84-5
0-100 CPS
1:200 SCALE
TC = 2SEC's
MITRE G.
19·12·84

-10m
TC = 2
GAMMA

-10m

-20m

-30m

-40m

-50m

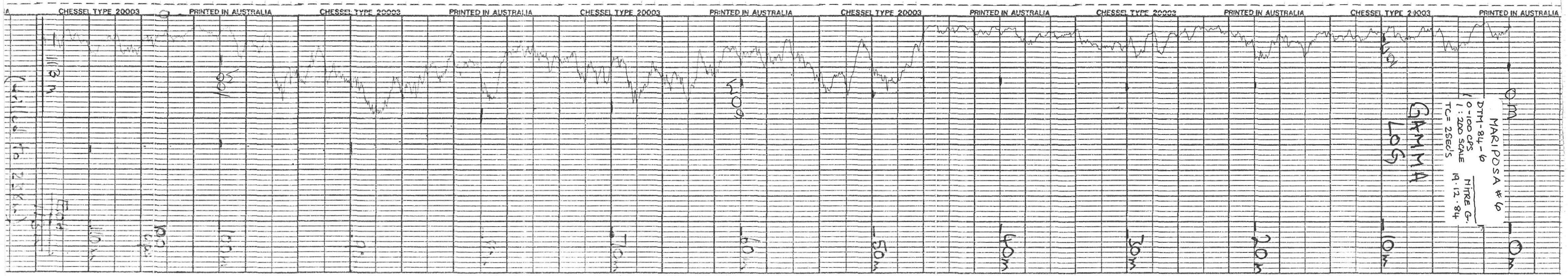
-60m

100 cps

-70m

EOH

80m
Steel Casing 60m to 90m Drilled to
Mariposa # 5
1:1000 cps


CHESSEL TYPE 20003
PRINTED IN AUSTRALIA
MARIPOSA #6
DTM-84-6
0-100 CPS
1:200 SCALE
TC= 2SECS
HIRE G.
19.12.84
GAMMA LOG
0m
-10m
-20m
-30m
-40m
-50m
-60m
-70m
-80m
-90m
-100m
-110m
-120m
-130m
-140m
-150m
-160m
-170m
-180m
-190m
-200m
-210m
-220m
-230m
-240m
-250m
-260m
-270m
-280m
-290m
-300m
-310m
-320m
-330m
-340m
-350m
-360m
-370m
-380m
-390m
-400m
-410m
-420m
-430m
-440m
-450m
-460m
-470m
-480m
-490m
-500m
-510m
-520m
-530m
-540m
-550m
-560m
-570m
-580m
-590m
-600m
-610m
-620m
-630m
-640m
-650m
-660m
-670m
-680m
-690m
-700m
-710m
-720m
-730m
-740m
-750m
-760m
-770m
-780m
-790m
-800m
-810m
-820m
-830m
-840m
-850m
-860m
-870m
-880m
-890m
-900m
-910m
-920m
-930m
-940m
-950m
-960m
-970m
-980m
-990m
-1000m
-1010m
-1020m
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-1040m
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-1060m
-1070m
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-1100m
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-1150m
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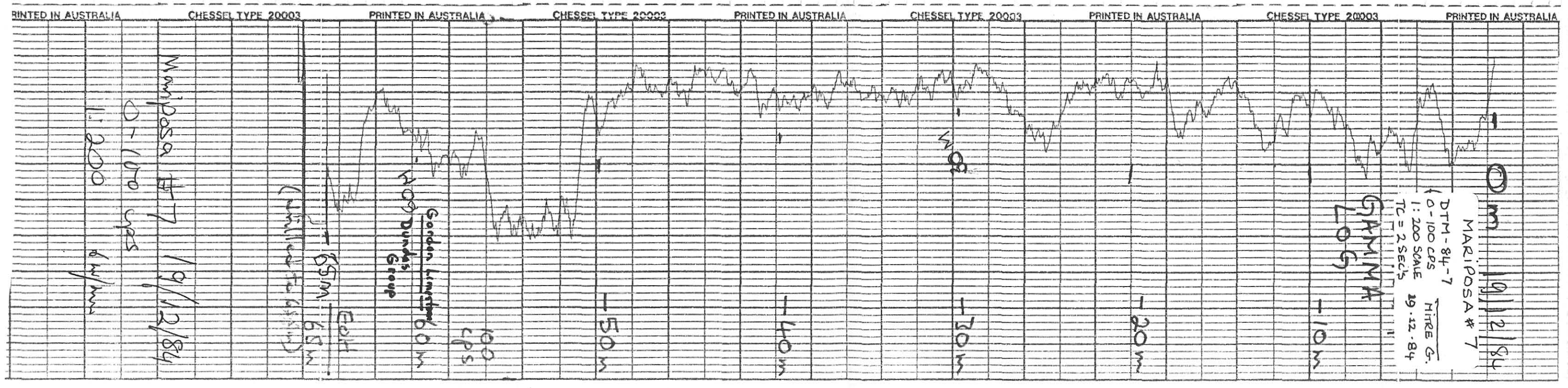
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CHESSEL TYPE 20003
Mariposa #7
0-100 cps
1:200
19/12/84
(Limited Testing)
Gordon Lindsay Group
DTM-84-7
0-100 CPS
1:200 SCALE
TC = 2 SEC'S
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-9210m
-9220m
-9230m
-9240m
-9250m
-9260m
-9270m
-9280m
-9290m
-9300m
-9310m
-9320m
-9330m
-9340m
-9350m
-9360m
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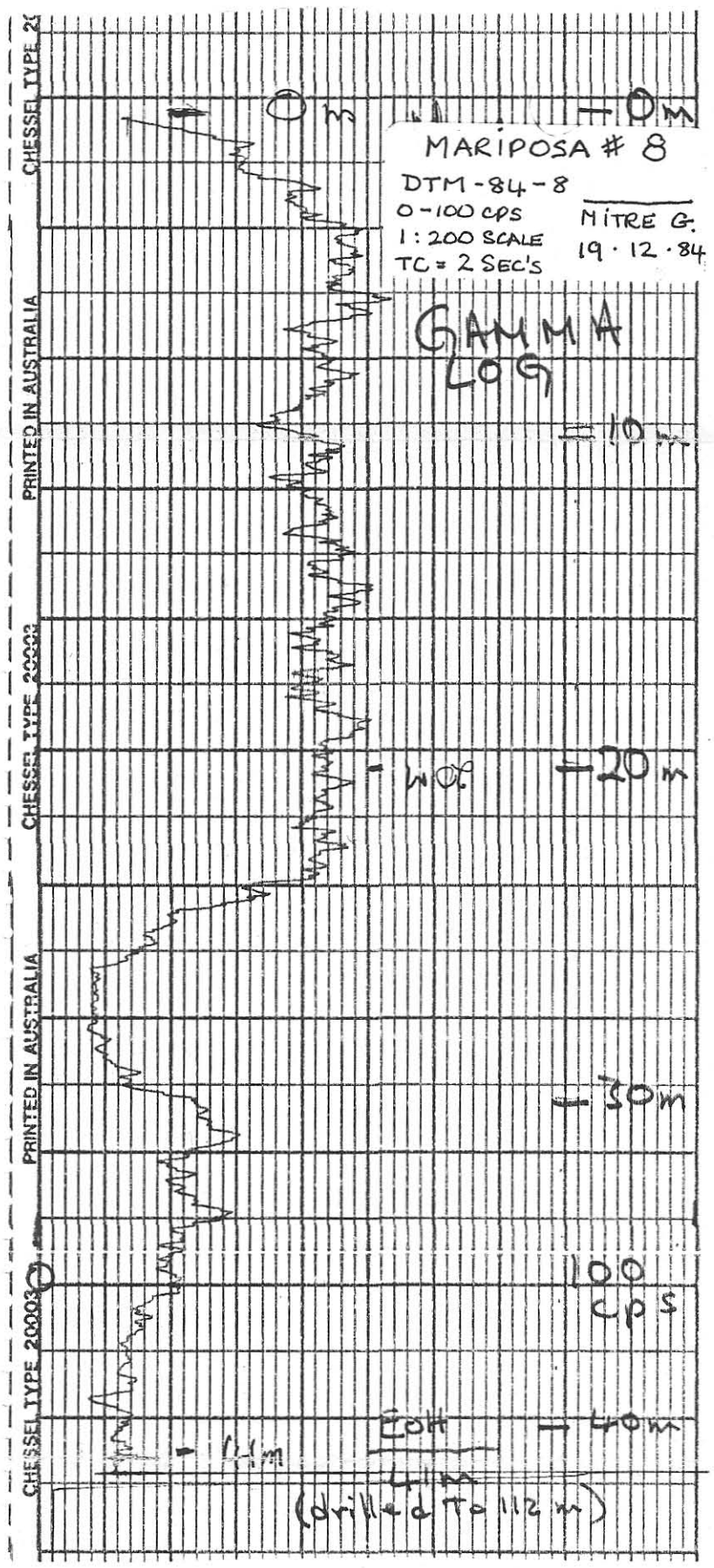
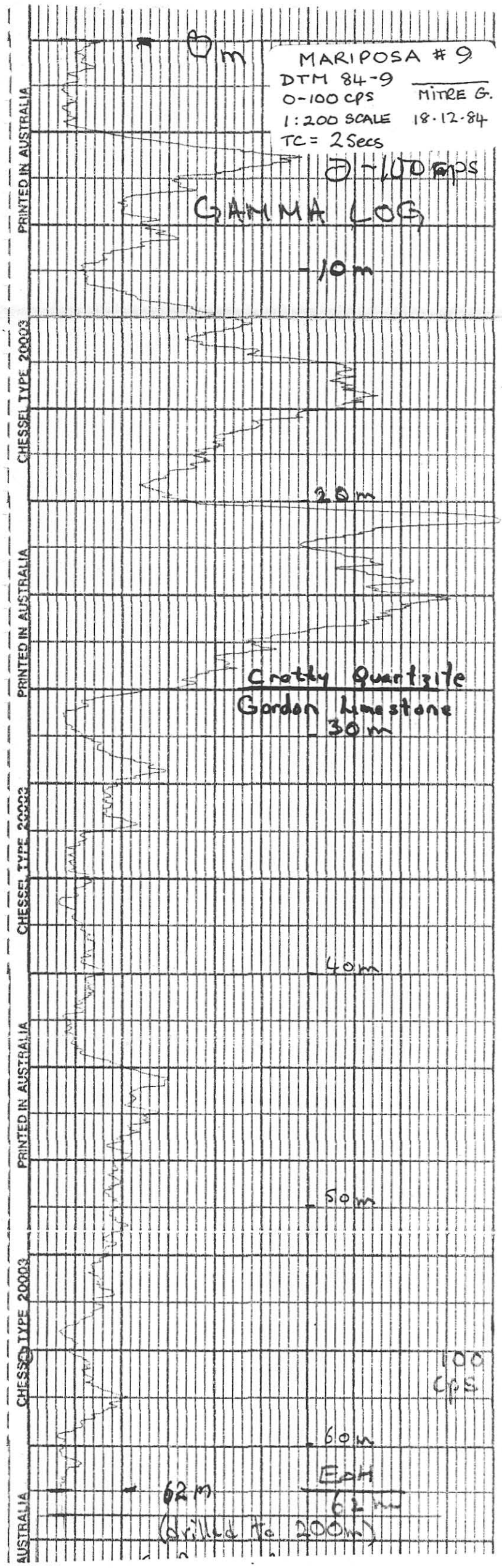
-9450m
-9460m
-9470m
-9480m
-9490m
-9500m
-9510m
-9520m
-9530m
-9540m
-9550m
-9560m
-9570m
-9580m
-9590m
-9600m
-9610m
-9620m
-9630m
-9640m
-9650m
-9660m
-9670m
-9680m
-9690m
-9700m
-9710m
-9720m
-9730m
-9740m
-9750m
-9760m
-9770m
-9780m
-9790m
-9800m
-9810m
-9820m
-9830m
-9840m
-9850m
-9860m
-9870m
-9880m
-9890m
-9900m
-9910m
-9920m
-9930m
-9940m
-9950m
-9960m
-9970m
-9980m
-9990m
-10000m

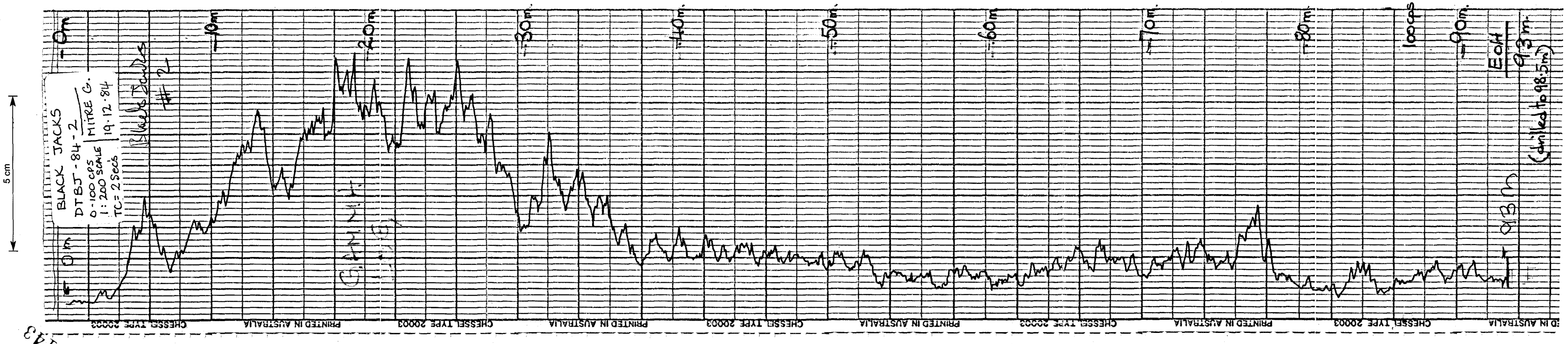
5 cm

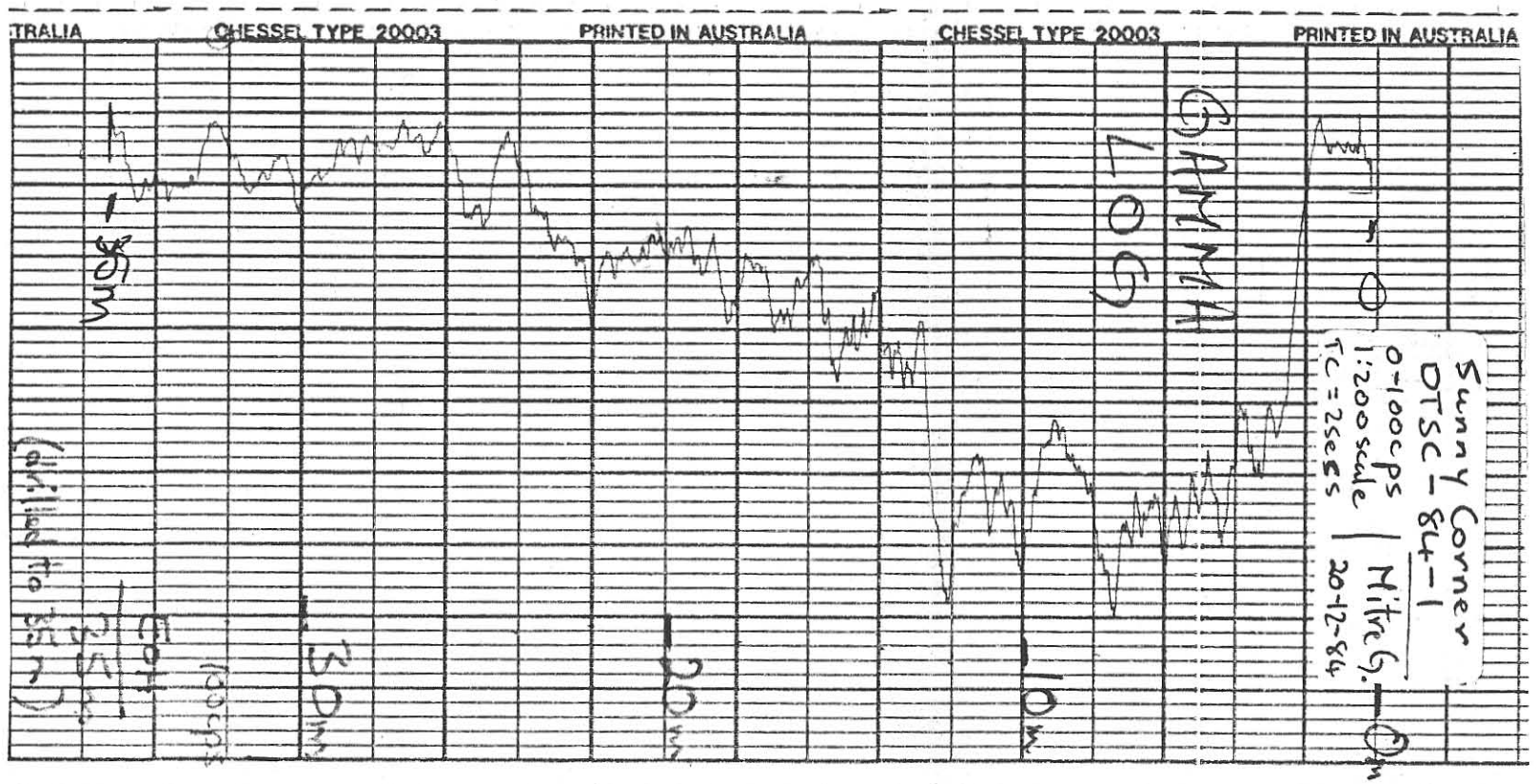
115143

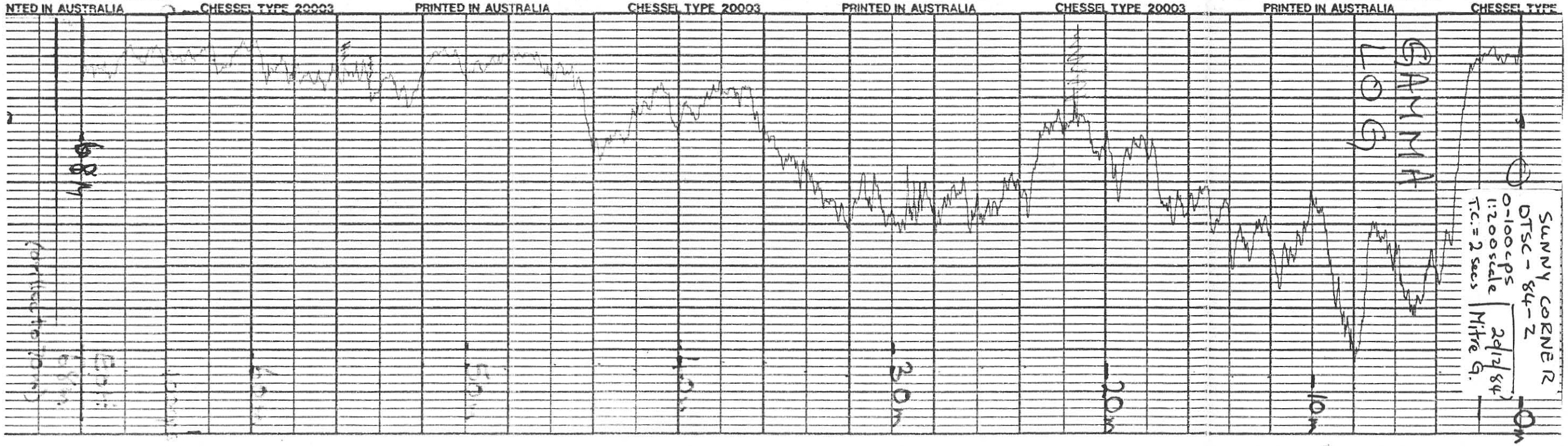

MARIPOSA # 8
DTM-84-8
0-100 cps
1:200 SCALE
TC = 2 SEC's
MITRE G.
19 · 12 · 84
GAMMA LOG
0 m
10 m
20 m
30 m
100 cps
EOH
(Drilled To 112 m)
40 m
PRINTED IN AUSTRALIA
CHESSEL TYPE 20003


MARIPOSA # 9
DTM 84-9
0-100 cps
1:200 SCALE
TC = 2 Secs
MITRE G.
18 · 12 · 84
0-100 cps
GAMMA LOG
0 m
10 m
20 m
Crotty Quartzite
Gordon Limestone
30 m
40 m
50 m
60 m
62 m
EOH
(Drilled To 200 m)
100 cps
PRINTED IN AUSTRALIA
CHESSEL TYPE 20003

5 cm


BLACK JACKS
DT BJT - 84 - 2
0-100 ohms
1:200 SCALE
TC = 2 Secs
MITRE G.
19.12.84
Blade Runner #2
0m
10m
20m
30m
40m
50m
60m
70m
80m
90m
100cps
EOH
9.3m
(drilled to 98.5m)
5 cm
CHESSEL TYPE 20003
PRINTED IN AUSTRALIA


CHESSEL TYPE 20003
PRINTED IN AUSTRALIA
GAMMA
Sunny Corner
DTSC - 84-1
0-100cps
1:200 scale
T.C. = 2secs
Nitre G.
20-12-84
0m
10m
20m
30m


CHESSEL TYPE 20003
PRINTED IN AUSTRALIA
GAMMA
SUNNY CORNER
DTSC - 84-2
0-100cps
1:200 scale
T.C. = 2 secs
20/12/84
Nitre G.
0m
10m
20m
30m

115146

SUNNY CORNER
DTSC-84-3
0-100cps
1:200 scale
T.C.=2secs
Mitre G.
20/12/84

GAMMA LOG

0m
-10m
-20m
-30m
-40m
-50m
-60m
-70m
-80m
-90m

Crotty Quartzite
Gordon Limestone

CHESSEL TYPE 20003 PRINTED IN AUSTRALIA

5 cm

Sunny Corner
DTSC-84-4
0-100cps
1:200 scale
T.C. = 2secs
20/12/84
Mitre G.

GAMMA LOG

0m
-10m
-20m
-30m
-40m
-50m
-60m
-70m
-80m
-90m

Crotty Quartzite
Gordon Limestone

CHESSEL TYPE 20003 PRINTED IN AUSTRALIA

T.C. # SA — 0m

Sunny Corner
DTSC-84-5A
0-100cps
1:200
T.C. = 2secs
Mitre G.
20-12-84

GAMMA
LOG

— 10m

— 20m

— 30m

— 40m

Crabby Quartzite
Garden Limestone

— 50m

— 60m

— 70m

— 80m

— 90m

— 100m

— 110m

— 120m

100cps

— 130m

(Drilled to 143m) T.D.
135m

CHESSEL TYPE 20003 PRINTED IN AUSTRALIA

5 cm

147

115149

APPENDIX 4

BOREHOLE AND SURFACE PEM SURVEYS
by Crone Geophysics

NOTE: LOOP LOCATIONS PLOTTED ON
ENCLOSURES 1, 2 AND 3
OF THIS REPORT

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115150

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
BLACKJACK	DTBJ84-2	1

Time base: 10ms
Ramp time: 1.5ms

ZTS: 625
Gain: 200

Date: 14/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	6.2	1.5	0.4	0.4	-0.5	0.8	-0.3	0.3	-151	200
10m	5.8	1.3	-0.2	-0.8	-1.8	-1.7	-1.2	-0.2	-180	200
15m	5.8	1.0	-0.1	-0.2	-1.3	-1.1	-0.9	-1.2	-229	200
20m	6.3	1.2	0.0	-0.3	-1.2	-0.5	-1.6	-1.5	-240	200
25m	6.1	1.0	-0.4	0.0	-0.7	0.3	-0.4	0.3	-279	200
30m	6.2	1.0	-0.1	-0.5	-1.2	-0.8	-1.1	0.1	-318	200
35m	6.4	1.0	-0.2	-0.6	-1.4	-0.8	-1.5	-0.6	-371	200
40m	7.0	1.1	0.0	0.1	-0.8	-1.0	-1.0	-0.6	-407	200
45m	6.7	0.9	-0.2	-0.2	-1.5	-0.8	-1.8	-0.5	-458	200
50m	6.9	0.6	-0.2	-0.2	-1.3	-0.9	-1.0	0.2	-499	200
55m	7.1	1.1	0.1	-0.1	-0.8	-1.1	-0.7	-0.7	-534	200
60m	7.2	0.9	-0.1	-0.2	-1.0	-0.2	-1.3	0.3	-567	200
65m	7.3	1.2	0.3	-0.2	-1.2	-0.7	-1.6	-0.5	-587	200
70m	7.0	0.6	-0.6	-1.2	-1.8	-0.4	-0.7	0.5	-596	200
75m	6.9	0.6	-0.1	-0.4	-1.3	-0.9	-1.6	-1.2	-602	200
80m	6.7	0.9	-0.1	-0.3	-1.2	-0.5	-1.6	-1.5	-599	200
85m	6.7	0.7	-0.5	-0.8	-2.4	-1.7	-2.6	-0.6	-576	200
90m	6.6	1.1	0.0	-0.3	-1.1	-0.4	-2.4	-0.9	-537	200
93m	6.4	1.2	-0.2	-0.5	-1.1	0.5	-1.1	0.9	-522	200

CRONE GEOPHYSICS Limited

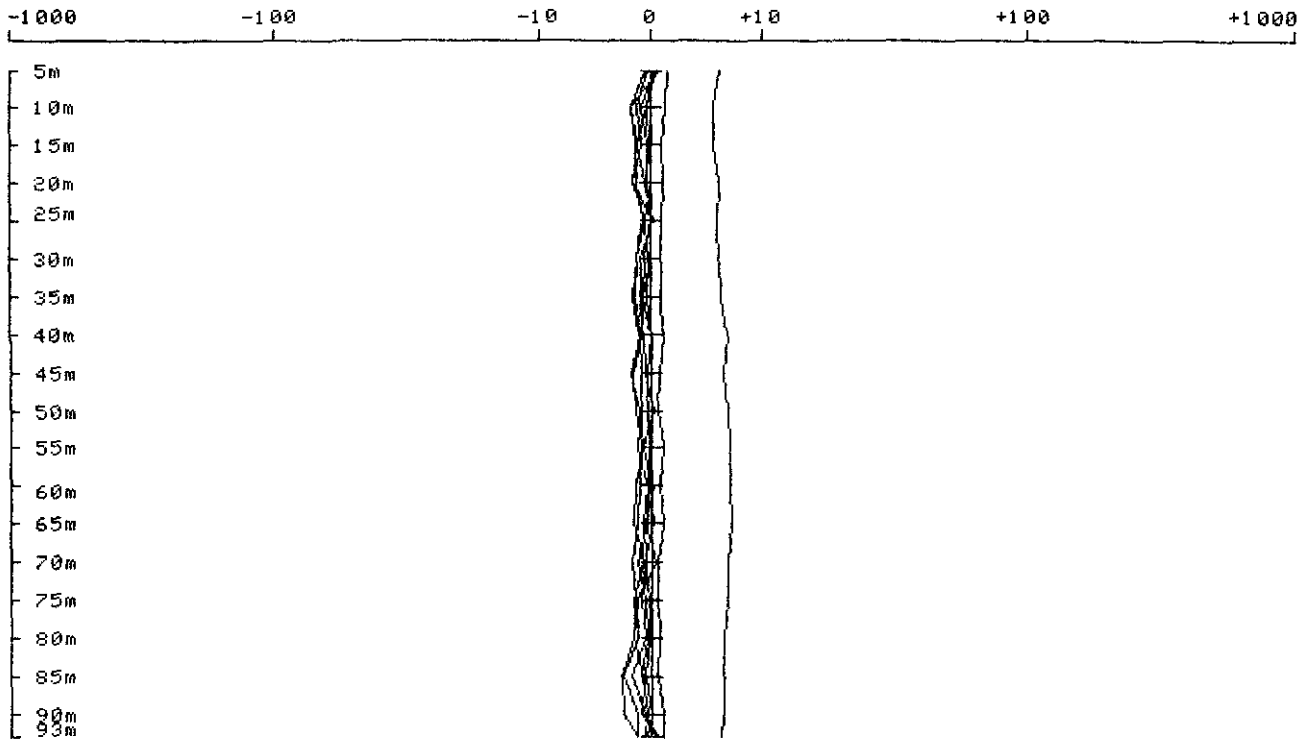
BOREHOLE PEM

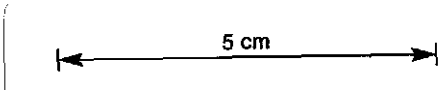
Client
AMOCO

Grid	Hole	Tx Loop
BLACKJACK	DTBJ84-2	1

Time base: 10ms	ZTS: 625	Date: 14/02/85
Ramp time: 1.5ms	Gain: 200	

Scale: 1:1000





150

115152

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
BLACKJACK	DTBJ84-2	1

Time base: 10ms
Ramp time: 0.5ms

ZTS: 115
Gain: 200

Date: 14/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	38.4	8.1	0.8	-0.4	-0.7	0.2	-0.1	1.2	-908	200
10m	40.1	8.2	0.8	-0.3	-0.6	-0.5	-1.3	-0.7	-1073	200
15m	41.0	7.8	0.0	-0.9	-1.6	-1.2	-1.9	-0.2	-1236	200
20m	42.1	7.4	-0.1	-0.9	-1.0	-0.5	-1.5	-0.4	-1243	200
25m	43.7	7.4	-0.4	-1.3	-1.8	-0.8	-1.4	-0.6	-1243	200
30m	44.6	7.1	-0.4	-1.1	-1.4	-0.4	-1.1	-0.5	-1244	200
35m	47.0	7.8	0.1	-0.9	-1.5	-0.6	-2.2	-0.9	-1244	200
40m	48.6	8.1	0.6	-0.7	-1.4	-0.9	-2.4	-0.6	-1244	200
45m	50.6	8.1	0.1	-0.8	-1.0	-0.9	-1.1	0.4	-1244	200
50m	52.2	8.1	0.3	-0.8	-1.3	-0.2	-1.7	-1.6	-1244	200
55m	52.9	8.4	0.5	-1.2	-1.5	-1.3	-2.2	-1.2	-1244	200
60m	55.1	8.5	0.7	-0.6	-1.5	0.0	-2.0	0.2	-1244	200
65m	55.5	8.4	0.2	-1.0	-1.5	-1.3	-1.8	0.0	-1244	200
70m	53.7	8.4	0.7	-0.9	-1.2	-0.5	-1.4	0.2	-1244	200
75m	52.7	7.8	-0.2	-1.4	-2.2	-0.9	-0.9	0.5	-1244	200
80m	52.8	8.1	0.4	-1.0	-1.5	-1.1	-2.8	-0.3	-1243	200
85m	51.1	7.7	-0.1	-1.1	-1.6	-1.1	-2.1	0.2	-1243	200
90m	49.5	7.4	0.7	-0.7	-1.1	-0.5	-1.9	-0.3	-1243	200
93m	47.8	7.7	0.3	-1.2	-1.8	-1.4	-1.8	0.1	-1243	200

151

115153

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

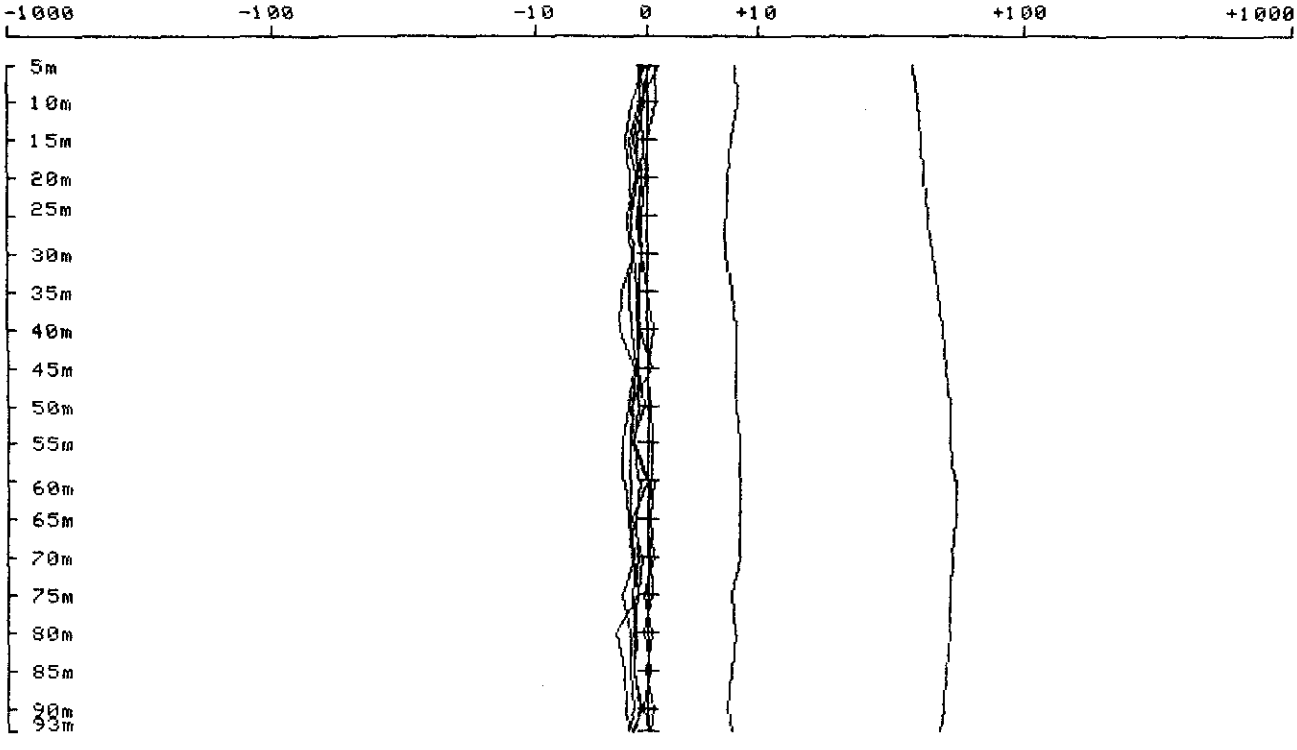
Grid	Hole	Tx Loop
BLACKJACK	DTBJ84-2	1

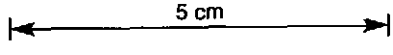
Time base: 10ms
Ramp time: 0.5ms

ZTS: 115
Gain: 200

Date: 14/02/85

Scale: 1:1000





115154

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
MARIPOSA	DTM84-1	2

Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 14/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	439.8	272.4	176.8	120.7	76.2	44.4	25.9	15.0	1230	200
10m	257.2	146.5	85.7	53.5	28.7	12.9	5.6	2.9	1230	200
15m	159.6	84.2	42.6	22.6	8.4	0.5	-1.3	-0.8	1230	200
20m	114.7	57.9	27.2	13.3	3.3	-1.2	-3.9	-2.4	1230	200
25m	96.5	47.4	21.1	10.4	3.5	-0.3	-1.9	-2.8	1230	200
30m	87.4	43.0	18.3	9.2	3.0	0.9	-0.6	0.2	1230	200
35m	77.2	37.5	15.7	7.8	2.6	-0.2	-0.8	-1.5	1230	200
40m	75.4	36.5	14.7	7.2	2.7	0.4	-1.2	-0.8	1229	200
45m	69.5	33.5	13.3	6.9	3.3	1.9	0.3	-0.5	1229	200
50m	66.7	31.2	11.9	5.8	2.4	1.0	0.0	0.0	1229	200
55m	64.7	29.3	10.9	5.0	1.5	-0.3	0.0	-0.4	1229	200
60m	63.9	29.1	10.4	4.6	1.9	-0.1	-0.7	-1.6	1229	200
65m	61.8	28.4	9.8	4.5	1.8	0.4	-0.8	-1.8	1229	200
70m	62.1	27.7	9.4	4.2	1.1	0.1	-0.4	-0.6	1229	200
75m	60.6	27.1	8.9	4.2	1.5	0.5	-1.5	-1.2	1229	200
80m	58.1	25.9	8.0	3.9	0.9	1.1	-0.5	0.4	1229	200
85m	57.1	25.3	8.1	3.5	1.1	0.5	-1.5	-1.3	1229	200
90m	57.5	25.2	7.8	3.2	0.6	0.1	-1.0	-1.3	1229	200
95m	56.7	25.1	7.6	3.3	1.3	0.7	0.0	0.5	1229	200
100m	56.3	24.9	7.9	3.7	1.7	0.7	-0.2	0.0	1229	200
105m	56.8	24.7	7.8	3.3	1.0	0.9	0.7	0.8	1228	200
110m	54.7	23.7	7.6	2.8	0.4	-0.6	-0.4	1.2	1229	200
115m	54.6	23.4	7.1	2.7	0.3	-0.5	-1.2	-1.1	1229	200

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115155

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

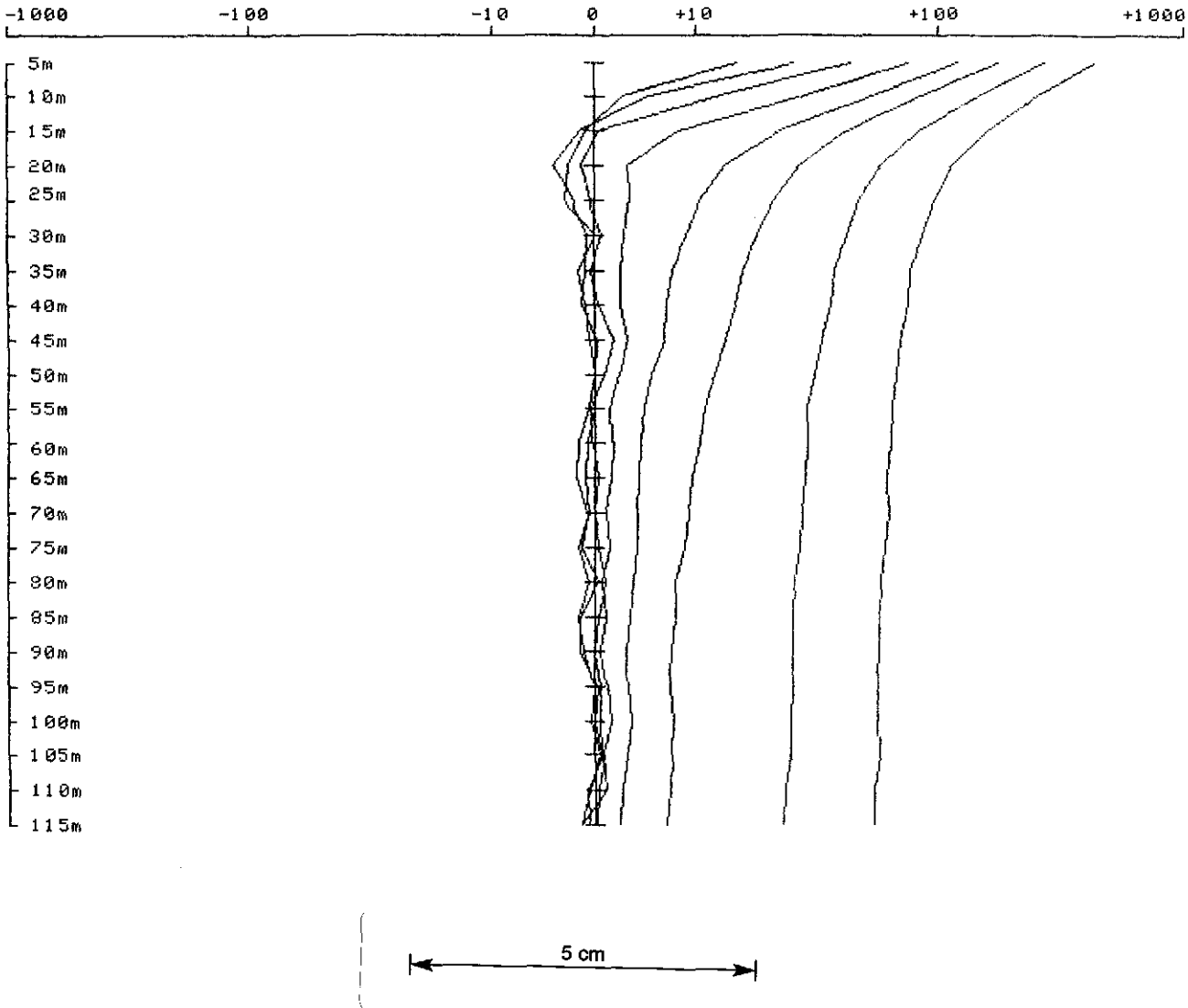
Grid	Hole	Tx Loop
MARIPOSA	DTM84-1	2

Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 14/02/85

Scale: 1:1000



154

115156

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid
MARIPOSA

Hole
DTM84-2

Tx Loop
2

Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 14/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	60.1	21.3	2.6	-1.5	-2.4	-1.2	-2.9	-1.5	-1222	200
10m	60.6	21.0	2.6	-1.0	-1.6	-1.6	-3.2	-2.2	-1235	200
15m	60.4	20.4	2.4	-1.4	-1.9	-0.6	-0.5	-1.0	-1242	200
20m	59.2	19.7	1.4	-1.6	-2.2	-1.0	-0.8	-0.3	-1247	200
25m	60.8	19.6	0.7	-2.1	-2.2	-1.2	-2.4	-0.5	-1250	200
30m	55.2	16.7	-0.4	-2.9	-3.2	-1.4	-2.5	-1.6	-1250	200
35m	58.7	18.0	0.0	-2.3	-2.0	-1.1	-1.1	0.4	-1251	200
40m	60.0	17.9	0.1	-2.8	-2.2	-1.0	-2.0	-0.5	-1251	200
45m	61.5	18.2	-0.1	-2.7	-2.8	-1.9	-1.5	1.9	-1252	200
50m	61.5	17.7	-0.2	-2.6	-2.2	-0.3	-0.5	0.7	-1252	200
55m	62.5	18.0	-0.3	-3.1	-2.8	-1.2	-2.2	-0.1	-1252	200
60m	63.8	18.6	0.5	-2.6	-2.8	-1.4	-1.9	1.0	-1252	200
65m	66.9	19.6	0.9	-1.9	-1.9	-0.8	-1.3	0.4	-1252	200
70m	70.0	20.8	1.9	-1.6	-1.7	-1.1	-1.2	-0.4	-1252	200
75m	74.2	22.6	3.0	-1.1	-1.2	-0.8	-1.5	0.8	-1252	200
80m	77.4	23.9	3.6	-1.0	-1.7	-0.9	-1.3	-0.3	-1252	200
85m	78.2	24.8	4.4	-0.5	-1.6	-0.8	-2.9	-0.5	-1252	200
90m	80.5	26.2	5.3	0.3	-0.8	-0.4	-1.9	0.1	-1252	200
95m	79.7	26.9	6.1	1.3	0.3	0.6	-0.8	0.8	-1252	200
100m	80.6	26.9	6.0	0.7	-0.7	-0.7	-2.3	-0.5	-1252	200
105m	80.2	27.8	6.3	1.6	-0.5	-0.6	-3.4	-0.4	-1252	200
110m	82.7	30.0	7.4	1.9	-0.8	0.4	-1.5	1.9	-1251	200
115m	82.4	29.0	7.1	1.5	0.0	-1.0	-2.7	-0.5	-1250	200
120m	81.6	29.4	7.9	2.6	0.8	0.8	0.2	0.4	-1247	200
125m	84.0	31.2	8.9	3.3	0.9	0.7	-0.8	0.9	-1239	200
130m	87.0	32.3	9.4	3.1	0.5	0.3	-0.2	-0.2	-1189	200
135m	67.2	25.0	5.5	1.8	0.5	0.4	0.2	0.2	-741	200
140m	75.2	28.4	7.2	2.1	-0.3	-2.3	-3.1	-0.2	-461	200
145m	75.3	28.4	7.2	2.6	0.4	-0.4	-1.6	-0.7	-99	200
150m	75.1	28.4	7.2	2.6	1.0	-0.6	-0.8	-1.9	334	200
155m	77.3	29.1	7.9	2.9	1.2	0.9	0.1	0.6	767	200
160m	78.9	30.1	8.6	3.6	1.3	0.5	0.3	1.5	983	200
165m	79.9	30.8	8.9	3.3	1.4	0.3	0.0	-0.3	1190	200
170m	81.8	31.2	9.2	3.6	1.1	0.9	-0.7	-0.1	1235	200
175m	81.9	31.9	9.7	3.9	1.4	0.7	0.8	0.6	1235	200
179m	83.3	32.0	9.7	3.8	1.3	0.5	0.2	0.6	1235	200

155

115157

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
MARIPOSA	DTM84-2	2

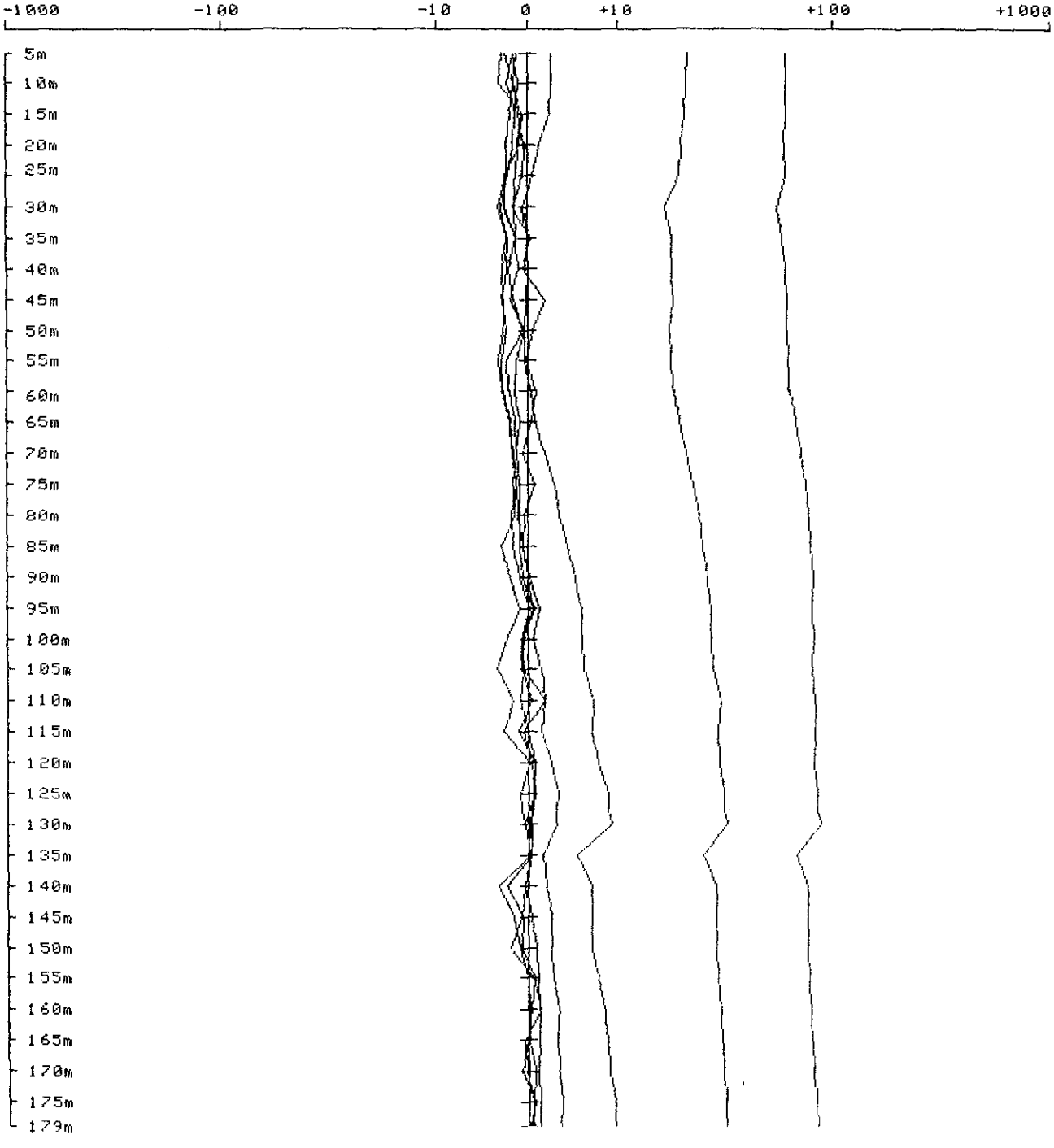
Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 14/02/85

Scale: 1:1000

5 cm



156

115158

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
amco

Grid	Hole	Tx Loop
MARIPOSA	HM844	2

Time base: 10ms
Ramp time: 0.5ms

ZTS: 131
Gain: 200

Date: 15/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	-31.0	-21.2	-22.1	-17.9	-12.6	-7.0	-6.1	-2.8	-1181	200
10m	6.5	-2.2	-7.1	-6.8	-5.5	-3.2	-2.8	0.5	-859	200
13m	18.3	3.6	-4.4	-5.0	-4.2	-2.6	-3.5	-2.2	-723	200
15m	21.8	5.2	-3.2	-4.3	-4.0	-1.9	-2.8	-1.1	-615	200
18m	28.8	9.5	-0.2	-1.4	-1.4	-0.8	-0.3	2.4	-361	200
20m	31.0	10.2	0.6	-1.3	-1.6	-1.0	-1.5	-0.3	-61	200
22m	33.3	11.9	1.7	-0.5	-0.9	-1.2	-2.2	0.2	344	200
25m	34.9	12.3	2.1	0.0	-0.8	0.0	-1.2	-0.3	975	200
30m	36.0	13.6	3.3	0.9	0.2	-0.5	-0.6	0.5	1222	200
35m	36.7	14.0	3.8	1.9	0.7	0.8	0.5	0.7	1217	200
40m	39.5	14.7	3.6	1.4	0.1	-0.4	-1.1	-0.5	1219	200
45m	39.9	14.5	3.8	1.2	-0.4	-0.4	-1.5	-1.2	1209	200
50m	42.9	15.7	4.0	1.5	0.3	0.4	-0.4	0.7	1222	200
55m	43.7	16.0	4.2	1.8	0.6	-0.3	-0.7	-0.4	1221	200
60m	46.3	17.3	5.2	2.0	0.2	0.5	0.6	0.2	1190	200
65m	45.6	17.8	5.5	2.8	1.2	0.7	0.4	1.5	1022	200
70m	48.2	18.9	6.0	2.7	1.2	1.0	-0.4	0.2	1181	200
73m	46.0	18.4	5.6	1.9	0.3	-0.3	-1.2	-1.3	1187	200
76m	46.3	18.4	5.5	2.5	0.6	-0.3	0.7	0.5	1191	200

157

115159

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
amco

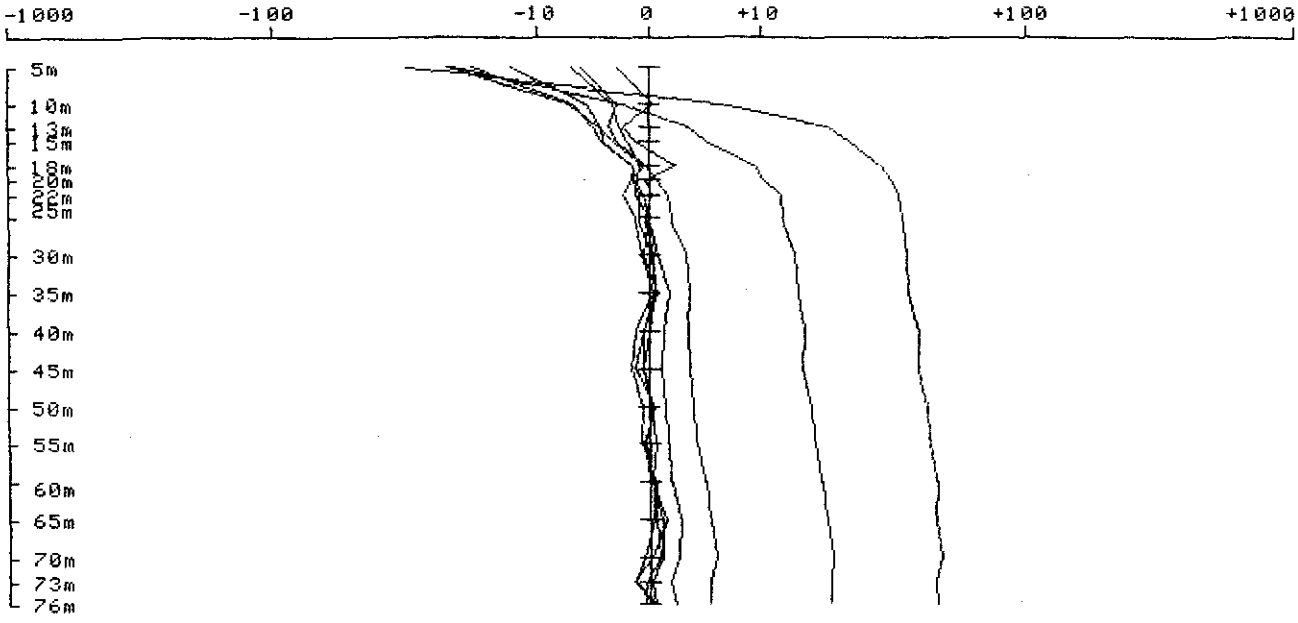
Grid	Hole	Tx Loop
MARIPOSA	HM844	2

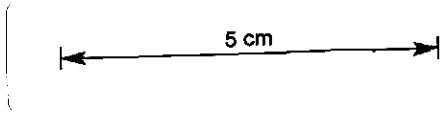
Time base: 10ms
Ramp time: 0.5ms

ZTS: 131
Gain: 200

Date: 15/02/85

Scale: 1:1000





158

115160

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
amco

Grid
MARIPOSA

Hole
HM846

Tx Loop
2

Time base: 10ms
Ramp time: 0.5ms

ZTS: 131
Gain: 200

Date: 15/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	126.9	73.2	47.3	35.9	27.0	20.3	15.2	11.3	1236	200
10m	113.0	58.6	33.0	21.7	13.2	7.8	5.2	4.5	1236	200
15m	109.0	55.0	29.4	18.9	11.1	5.9	3.5	2.1	1236	200
20m	108.7	54.6	28.8	17.9	10.3	4.7	1.8	1.5	1236	200
25m	108.4	54.3	28.7	17.5	9.6	4.4	2.4	0.9	1236	200
30m	108.2	53.8	28.8	17.9	8.9	4.1	2.2	1.2	1235	200
35m	108.9	54.2	28.7	17.3	8.9	3.5	1.0	-0.5	1236	200
40m	108.8	54.4	28.5	17.7	9.3	4.4	0.5	1.7	1236	200
45m	108.4	53.8	28.7	17.5	9.9	4.7	2.5	1.4	1236	200
50m	107.2	53.1	28.3	17.0	9.0	3.5	1.3	0.3	1236	200
55m	105.0	52.2	27.9	17.1	9.5	4.1	1.3	2.2	1236	200
60m	104.3	51.9	27.2	16.6	8.8	4.3	2.2	1.0	1236	200
65m	100.8	50.9	26.3	15.9	8.6	4.4	1.3	1.1	1236	200
70m	100.2	49.9	25.7	15.4	8.4	3.7	0.5	0.2	1236	200
75m	96.6	48.0	24.8	15.1	7.6	3.9	1.4	0.8	1235	200
80m	95.3	47.5	24.6	14.7	8.4	4.5	2.0	1.4	1236	200
85m	93.2	45.9	23.0	13.7	6.8	2.4	1.1	0.4	1235	200
90m	87.7	43.3	21.5	12.3	6.1	3.2	0.8	1.0	1235	200
95m	85.1	41.7	20.4	12.0	6.3	2.3	0.8	-0.3	1232	200
100m	82.2	40.2	20.0	11.6	6.0	2.9	0.0	1.6	1235	200
105m	78.2	38.4	18.7	10.7	5.7	2.4	0.7	0.2	1235	200
110m	75.2	36.9	17.5	10.2	5.0	1.8	0.6	0.6	1233	200
115m	73.4	35.9	17.1	9.7	4.9	2.1	0.5	0.8	1234	200

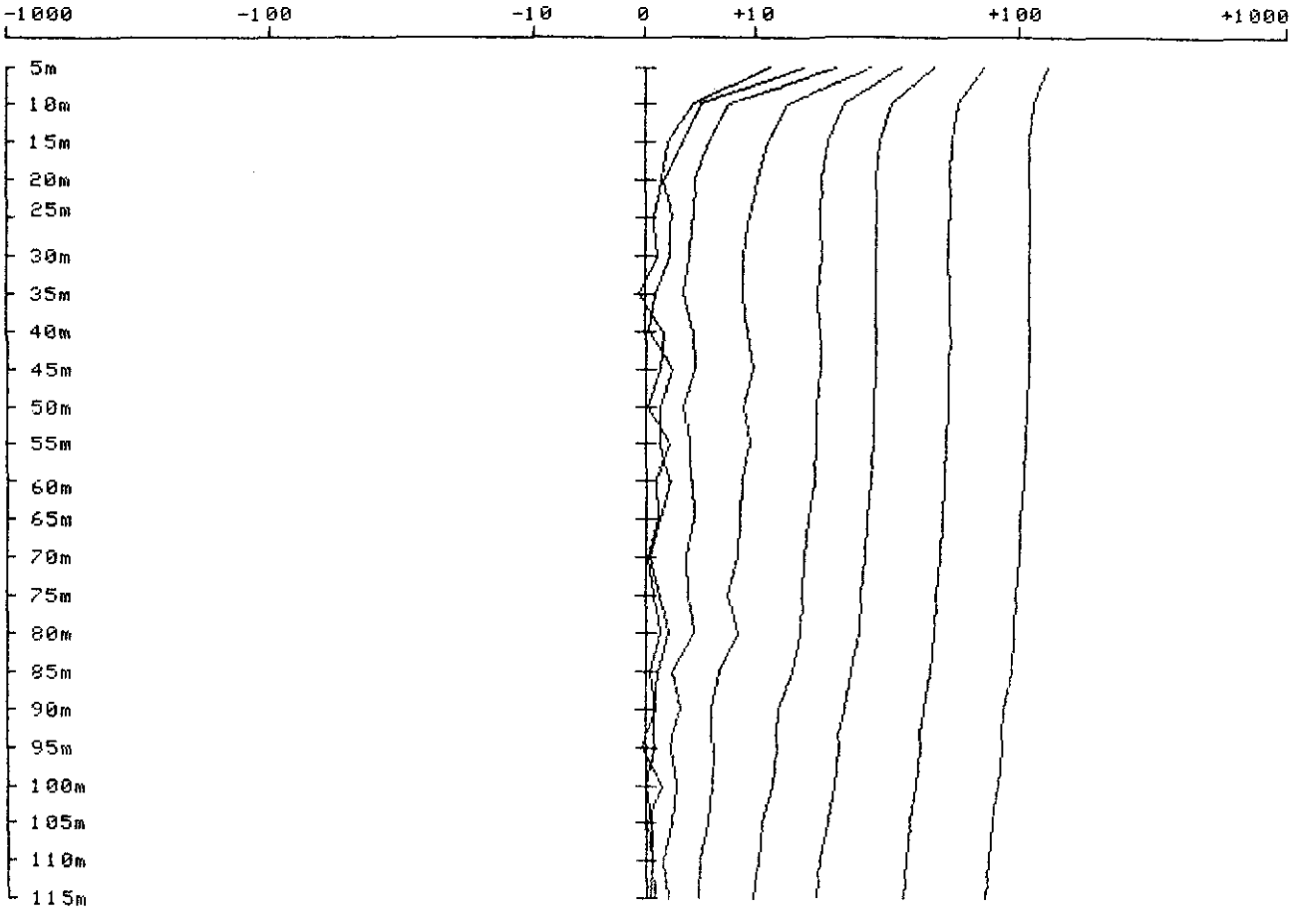
CRONE GEOPHYSICS Limited
BOREHOLE PEM

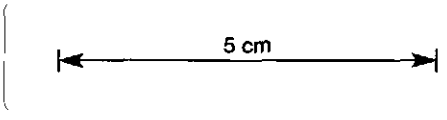
Client
amco

Grid	Hole	Tx Loop
MARIPOSA	HM846	2

Time base: 10ms	ZTS: 131	Date: 15/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:1000





160

115162

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid
MARIPOSA

Hole
DTM84-9

Tx Loop
Z

Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 14/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	31.9	4.6	-8.8	-9.9	-8.5	-7.1	-5.4	-3.8	-1240	200
10m	28.5	3.4	-8.9	-9.2	-7.4	-4.0	-3.2	-0.4	-1244	200
15m	23.3	2.1	-9.4	-9.0	-6.4	-4.2	-3.5	-2.3	-1247	200
20m	18.6	-0.5	-10.8	-9.0	-6.3	-3.2	-2.2	-0.2	-1247	200
23m	15.8	-2.3	-12.3	-10.5	-7.7	-4.9	-4.7	-1.5	-1248	200
26m	13.7	-3.3	-12.5	-10.4	-6.8	-3.2	-3.9	-3.0	-1248	200
29m	17.9	-1.8	-12.1	-10.2	-6.9	-3.6	-2.6	-0.4	-1248	200
32m	19.0	-1.6	-12.0	-10.3	-6.7	-3.6	-2.3	-1.2	-1246	200
35m	15.6	-3.4	-12.9	-10.8	-6.8	-3.6	-3.0	-0.9	-1248	200
38m	-1.6	-12.1	-17.3	-13.1	-8.1	-3.9	-3.0	-1.0	-1248	200
41m	-2.5	-12.1	-17.4	-13.3	-8.0	-4.3	-3.2	-0.6	-1248	200
44m	-0.5	-11.4	-17.1	-13.1	-7.9	-4.5	-3.9	-1.9	-1248	200
47m	2.9	-9.5	-15.6	-12.6	-8.2	-4.9	-3.5	-2.2	-1248	200
50m	6.7	-6.8	-14.5	-11.4	-7.4	-3.4	-3.0	-1.6	-1248	200
52m	7.5	-6.9	-13.8	-11.4	-7.2	-3.6	-2.8	0.3	-1247	200
55m	12.6	-4.1	-12.3	-10.3	-7.1	-3.8	-4.1	-1.5	-1246	200
57m	17.1	-1.9	-10.8	-8.9	-5.2	-2.5	-2.9	-0.8	-1247	200
60m	24.1	2.0	-9.1	-8.0	-5.8	-2.6	-2.3	-1.4	-1246	200
65m	32.5	6.1	-6.3	-6.0	-4.4	-2.2	-1.6	-1.1	-1244	200
70m	41.0	10.2	-3.4	-4.3	-3.3	-1.8	-2.5	-0.8	-1240	200
75m	47.9	13.9	-1.3	-3.0	-2.8	-1.1	-1.2	1.5	-1223	200
80m	55.5	17.7	0.8	-1.7	-2.2	-1.2	-1.8	-0.5	-1188	200
85m	60.9	20.1	3.0	-0.9	-1.7	-1.6	-1.6	-0.1	-1123	200
90m	65.3	23.4	4.4	0.8	0.1	-0.5	-2.5	-1.2	-984	200
95m	68.3	24.6	5.0	0.8	-0.6	-0.8	-2.2	0.3	-757	200
100m	71.9	26.9	6.3	2.2	0.1	0.2	-0.7	-0.5	-26	200
105m	73.7	27.5	6.2	1.3	-1.3	-1.0	-2.3	3.3	583	200
110m	76.5	29.1	7.9	3.0	1.2	0.4	0.3	-0.4	998	200
115m	76.9	29.6	8.6	3.4	1.5	-0.1	-0.9	-1.2	1235	200
120m	78.1	30.1	8.1	3.0	0.2	-0.1	-1.3	-2.0	1235	200
125m	78.6	30.1	8.4	2.9	0.1	-2.1	-2.6	-0.6	1235	200

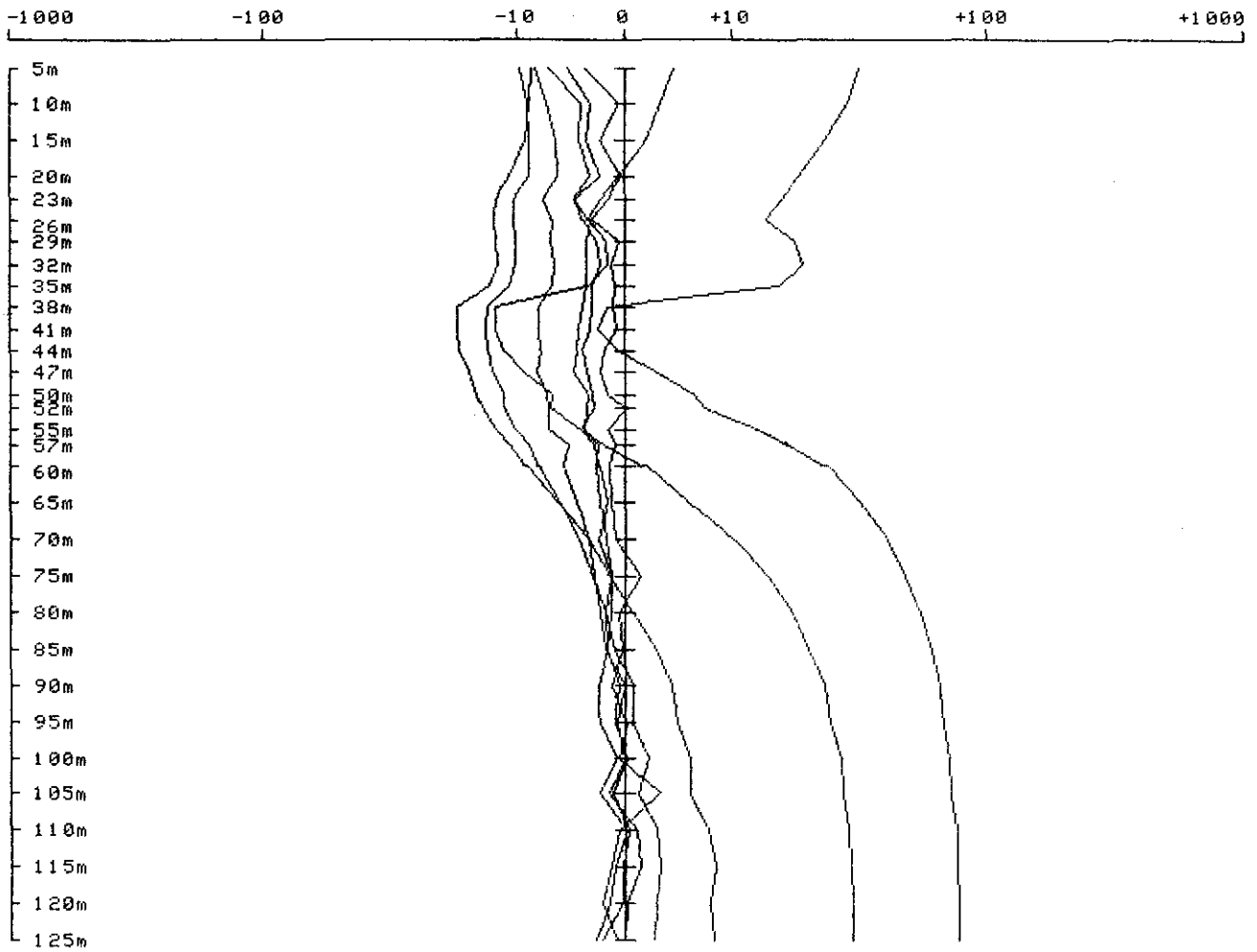
CRONE GEOPHYSICS Limited
BOREHOLE PEM

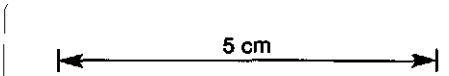
Client
AMOCO

Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	2

Time base: 10ms	ZTS: 125	Date: 14/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:1000





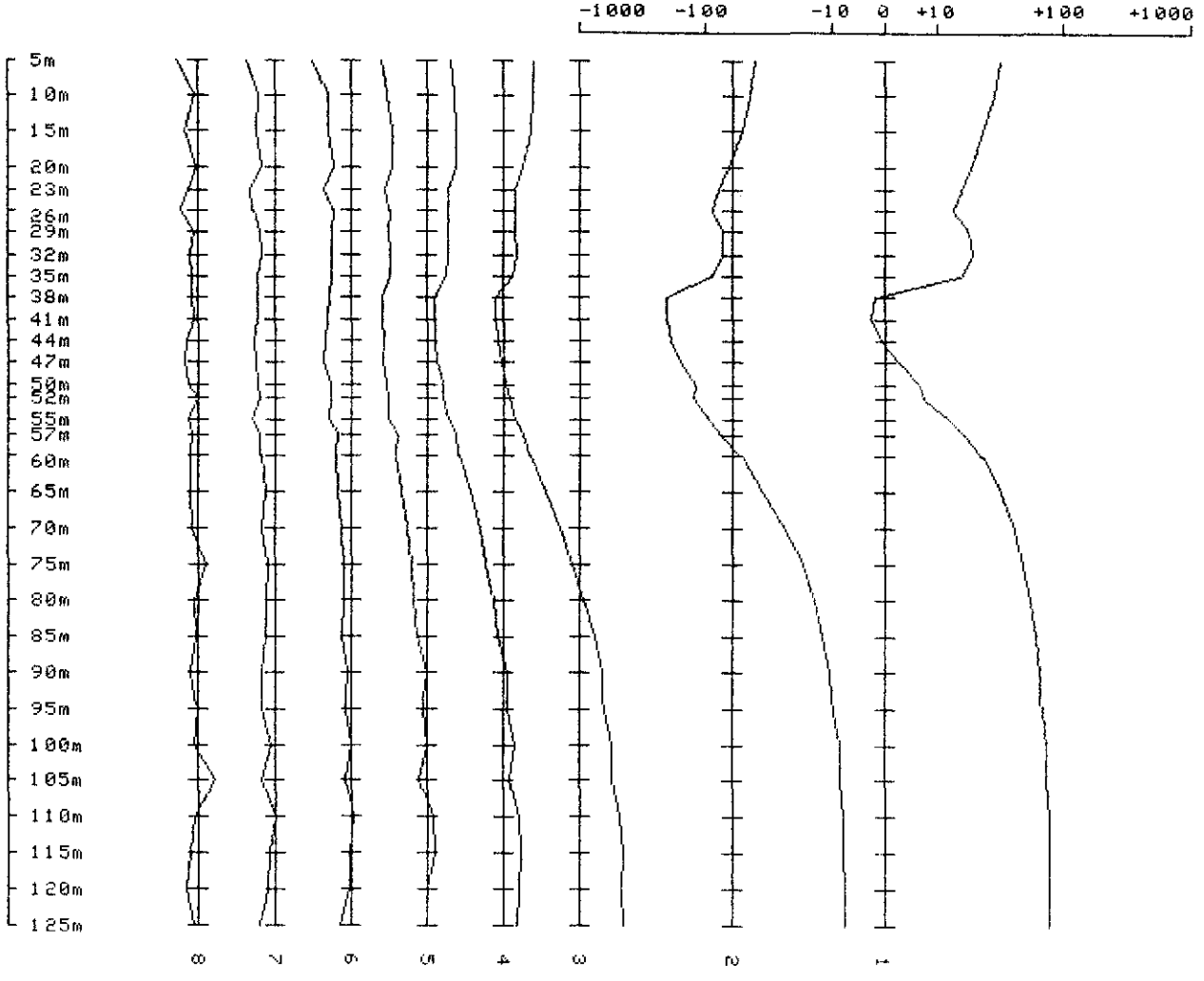
CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	2

Time base: 10ms	ZTS: 125	Date: 14/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:1000



5 cm

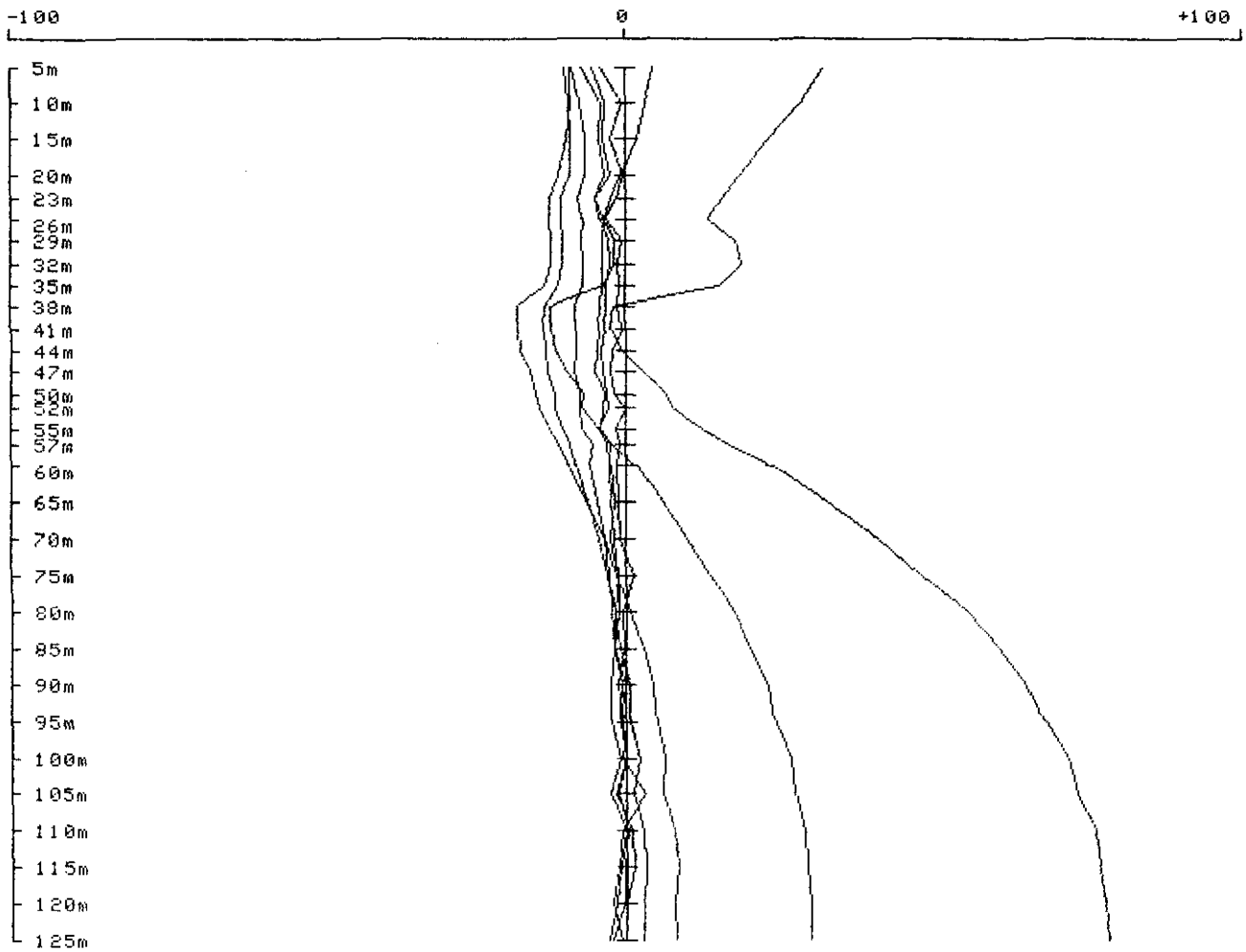
CRONE GEOPHYSICS Limited
BOREHOLE PEM

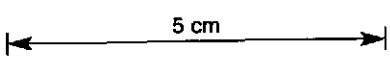
Client
AMOCO

Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	2

Time base: 10ms	ZTS: 125	Date: 14/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:1000





115166

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

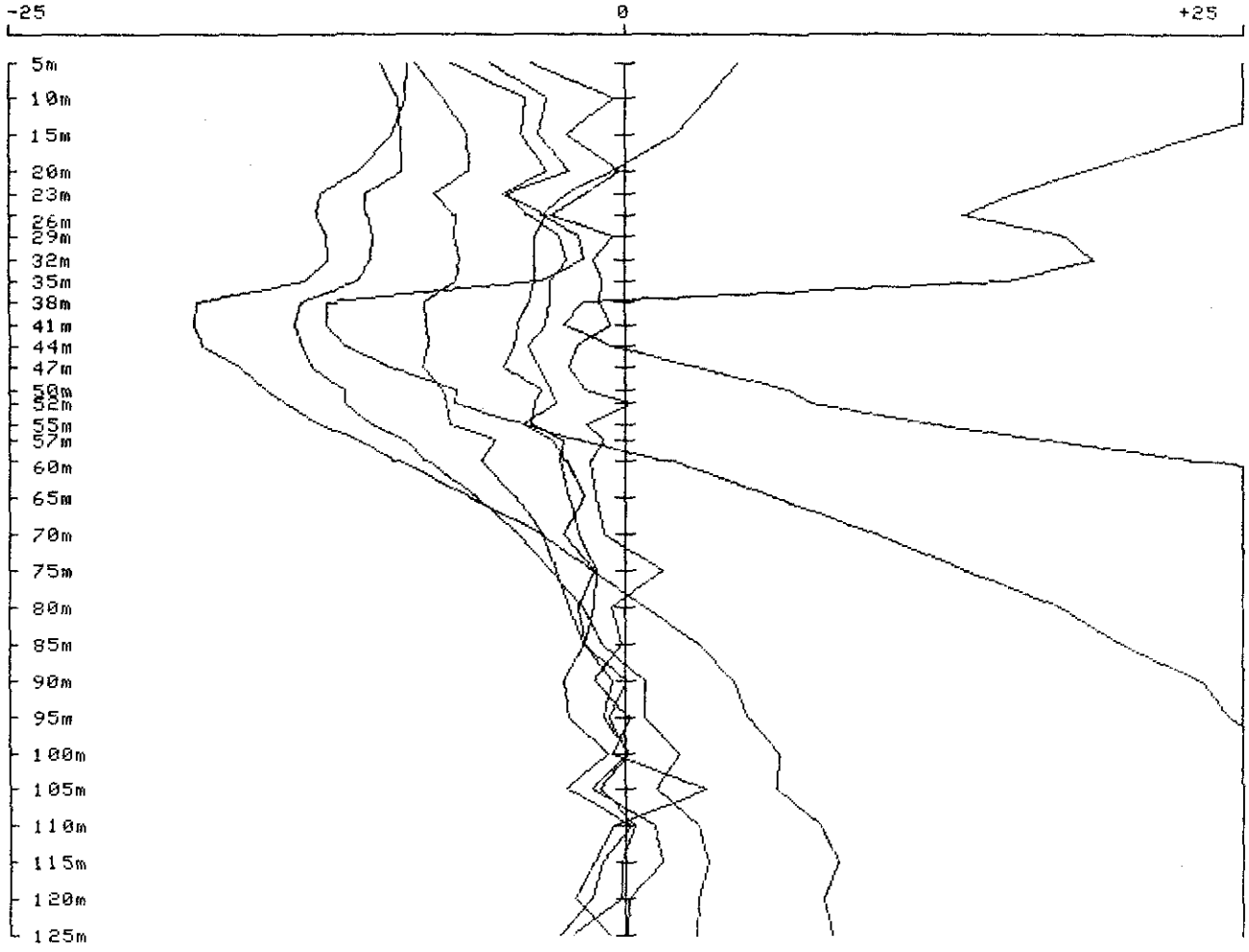
Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	2

Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 14/02/85

Scale: 1:1000



5 cm

165

115167

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

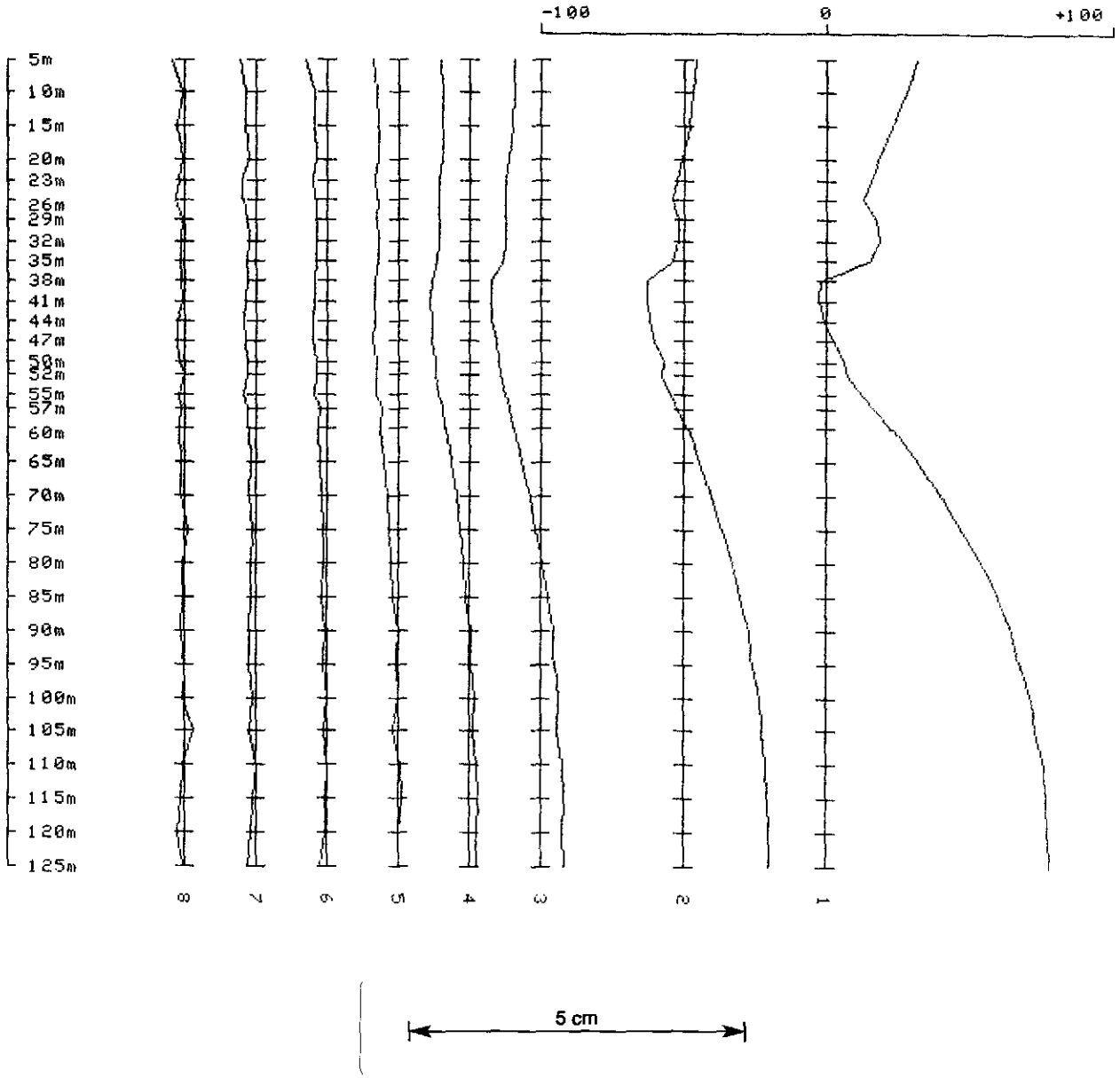
Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	2

Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 14/02/85

Scale: 1:1000



166

115168

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
amco

Grid	Hole	Tx Loop
MARIPOSA	HM847	3

Time base: 10ms
Ramp time: 0.5ms

ZTS: 127
Gain: 200

Date: 15/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	63.3	52.3	46.3	40.7	33.7	26.0	17.8	11.3	1187	200
8m	81.0	53.6	37.1	28.4	21.1	15.2	9.3	6.1	1225	200
10m	72.2	46.2	32.6	25.2	19.1	14.1	11.1	8.6	1224	200
13m	174.8	184.7	182.7	189.4	310.2	737.7	1425.7	1428.0	924	200
15m	-331.0	-458.4	-618.7	-747.5	-652.6	-42.7	992.9	1427.7	-343	200
17m	55.2	39.9	33.3	30.0	26.3	22.8	19.8	19.1	1222	200
20m	39.2	24.0	16.4	12.0	7.3	5.0	2.8	2.9	1221	200
22m	34.7	21.0	14.5	11.0	7.3	5.0	2.4	2.6	1223	200
25m	33.7	19.5	12.6	8.4	4.6	2.6	1.7	1.6	1223	200
30m	27.0	16.0	10.2	7.1	4.2	2.1	1.7	0.7	1222	200
35m	21.8	13.0	8.5	6.0	3.1	1.6	1.3	1.1	1223	200
40m	16.7	10.4	6.7	4.4	1.8	0.8	0.1	1.8	1221	200
45m	15.3	9.0	5.8	3.9	2.1	0.9	0.6	-0.2	1222	200
50m	15.9	9.1	5.6	3.8	1.5	1.2	0.0	0.7	1217	200
55m	15.4	8.5	5.6	4.5	2.4	1.6	0.9	0.5	1195	200
60m	14.1	7.8	5.3	2.8	1.1	0.0	-0.1	0.1	1196	200
64m	13.2	7.4	4.3	3.1	1.2	1.4	0.5	-0.2	1193	200

167

115169

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
amco

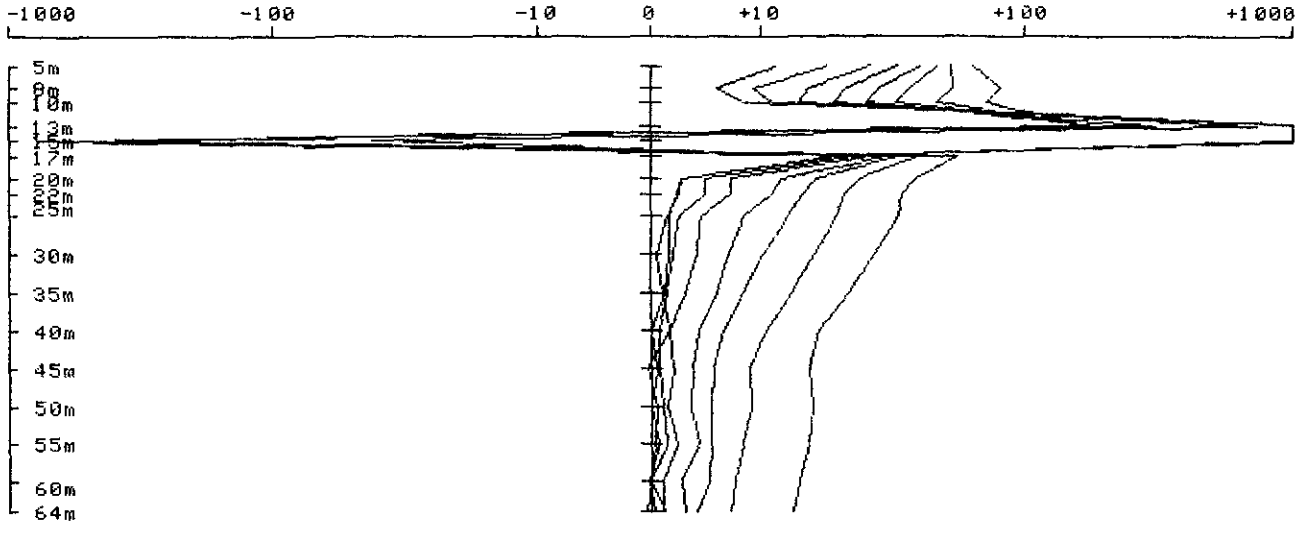
Grid	Hole	Tx Loop
MARIPOSA	HM847	3

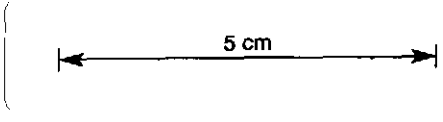
Time base: 10ms
Ramp time: 0.5ms

ZTS: 127
Gain: 200

Date: 15/02/85

Scale: 1:1000





168

115170

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid
MARIPOSA

Hole
HM84-9

Tx Loop
4S

Time base: 10ms
Ramp time: 0.5ms

ZTS: 120
Gain: 200

Date: 15/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	-4.9	-4.4	-4.1	-3.2	-2.3	-1.9	-2.2	-2.1	-1241	200
10m	-4.5	-4.0	-3.9	-2.5	-1.9	-1.2	-1.2	0.6	-1238	200
15m	-5.4	-4.0	-3.2	-2.2	-2.3	-0.7	-1.5	0.5	-1231	200
20m	-4.3	-3.1	-2.6	-1.6	-1.4	-0.2	-0.8	0.4	-1230	200
24m	-3.2	-3.1	-3.0	-1.9	-1.8	-1.0	-1.8	-0.5	-1201	200
27m	-3.7	-3.0	-3.0	-2.0	-1.7	-2.1	-1.8	0.2	-1192	200
30m	-2.9	-2.4	-2.5	-1.6	-1.3	-0.9	-2.4	-1.5	-1176	200
33m	-2.5	-2.2	-2.6	-1.2	-0.8	0.5	0.3	1.0	-1144	200
36m	-1.4	-1.6	-1.6	-0.8	-0.6	0.5	-1.0	0.2	-1122	200
39m	-1.3	-1.3	-1.6	-0.7	-0.3	0.2	-1.5	0.1	-1072	200
42m	-1.3	-0.9	-1.9	-1.0	-1.2	-0.7	-1.2	-0.4	-1014	200
45m	-1.1	-1.0	-1.6	-0.6	-0.6	-0.4	-1.6	-0.9	-891	200
50m	0.5	0.1	-1.4	-0.9	-0.8	-0.2	-0.7	-0.5	-626	200
55m	0.2	-0.2	-0.8	-0.8	-0.6	-0.5	-1.0	-1.4	-343	200
60m	1.2	0.5	-0.4	-0.4	-0.3	-0.9	-0.1	0.4	-22	200
65m	2.0	1.5	0.0	-0.3	-0.9	-0.3	-0.5	-1.4	193	200
70m	2.8	1.6	0.1	0.2	0.1	-0.2	-0.3	-1.1	383	200
75m	3.0	1.9	0.2	0.4	-0.2	0.1	0.7	0.6	528	200
80m	3.7	2.4	0.7	0.7	-0.2	0.0	0.1	0.3	650	200
85m	4.1	2.7	0.4	0.4	-0.2	0.3	-0.6	-1.0	750	200
90m	5.1	3.2	1.0	0.8	0.6	1.0	0.5	-0.4	783	200
95m	5.3	3.2	0.9	0.9	0.2	-0.4	0.0	0.2	838	200
100m	5.8	3.5	1.0	0.6	0.0	-0.1	-0.5	-0.8	879	200
105m	5.6	3.5	1.2	1.2	1.1	0.4	0.5	-0.3	877	200
110m	5.7	3.6	1.3	1.1	-0.1	0.3	-0.6	0.5	859	200
115m	5.9	3.5	1.0	0.6	-0.2	0.2	0.1	0.1	854	200
120m	6.3	3.7	1.4	1.1	0.8	1.0	0.8	1.4	840	200
125m	6.2	4.0	1.3	0.9	-0.2	-0.7	-1.6	-1.4	869	200

169

115171

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
amco

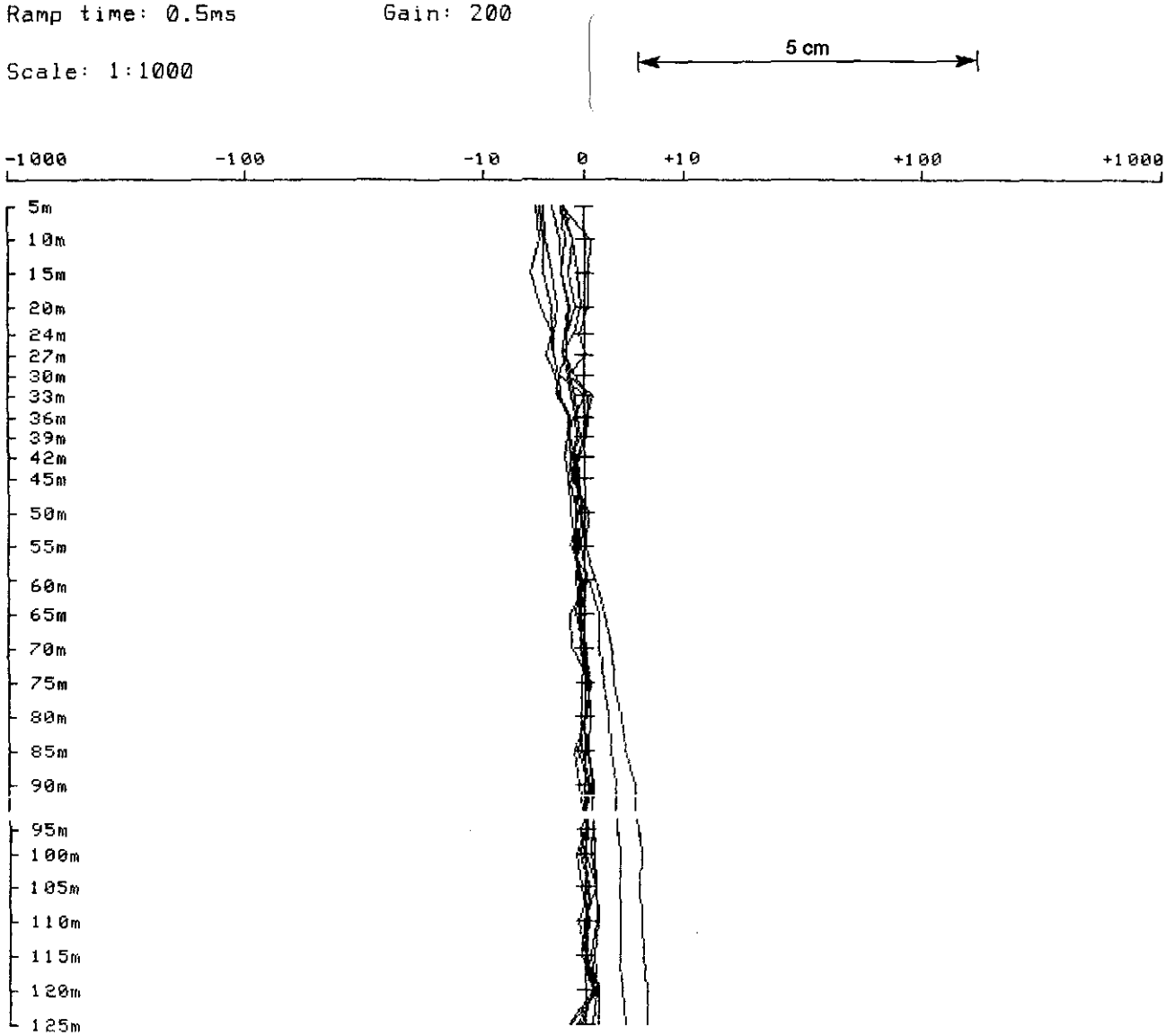
Grid	Hole	Tx Loop
MARIPOSA	HM849S	4

Time base: 10ms
Ramp time: 0.5ms

ZTS: 120
Gain: 200

Date: 15/02/85

Scale: 1:1000



CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	4S

Time base: 10ms
Ramp time: 0.5ms

ZTS: 115
Gain: 200

Date: 17/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	-1.1	-4.1	-3.3	-2.5	-1.9	-1.1	-2.4	-0.4	-1241	200
10m	-0.9	-3.8	-3.2	-2.2	-1.6	-0.3	-1.9	0.2	-1241	200
15m	-0.1	-3.2	-3.0	-2.0	-1.5	-1.0	-2.0	-0.2	-1241	200
20m	-0.3	-3.2	-2.5	-1.7	-1.6	-0.1	-1.7	0.5	-1240	200
25m	-0.5	-2.8	-2.6	-1.9	-2.3	-2.0	-3.6	-1.7	-1236	200
28m	-0.2	-2.5	-2.1	-1.2	-1.3	-0.4	-2.1	-0.1	-1234	200
31m	0.1	-2.3	-2.2	-1.4	-1.2	-1.1	-2.7	-0.2	-1232	200
34m	0.2	-1.8	-1.6	-1.2	-1.0	-0.9	-1.3	0.5	-1218	200
37m	0.9	-1.4	-1.5	-0.8	-1.2	-1.2	-1.7	-1.2	-1193	200
40m	0.7	-1.1	-1.1	-0.7	-1.0	-0.8	-1.9	-0.9	-1150	200
45m	0.7	-0.6	-1.0	-0.7	-0.8	-0.5	-0.8	-0.6	-925	200
50m	1.4	-0.2	-0.6	-0.7	-1.1	-0.8	-0.3	0.2	-694	200
55m	0.7	-0.5	-0.6	-0.2	-1.2	-1.2	-1.3	-0.8	-400	200
60m	0.7	-0.1	0.1	0.0	-1.2	-1.1	-1.2	-0.5	-95	200
65m	1.9	0.6	0.2	0.3	-1.2	-0.9	-0.5	-2.6	132	200
70m	2.4	1.3	0.7	0.5	-0.6	-0.5	-0.7	-0.9	300	200
75m	2.2	1.3	0.6	0.3	-1.0	-1.2	-1.7	-1.0	470	200
80m	2.8	1.8	0.5	0.4	-0.4	-0.3	0.6	-0.5	593	200
85m	3.4	2.2	1.0	0.8	0.0	0.3	0.2	0.0	683	200
90m	3.7	2.3	0.9	0.7	0.2	-0.3	0.2	0.7	752	200
95m	4.4	2.2	1.2	1.0	-0.1	0.2	-0.8	-0.5	784	200
100m	4.5	3.0	1.5	0.9	-0.4	-0.2	-0.4	-0.5	815	200
105m	4.6	2.8	1.5	1.0	-0.2	0.2	0.5	0.4	815	200
110m	4.6	2.7	1.0	0.5	-0.8	-0.5	-1.2	-1.5	812	200
115m	4.8	2.6	1.1	0.5	-0.4	-0.7	-0.3	-0.4	806	200
120m	5.6	3.3	2.1	2.0	0.5	0.5	1.4	1.5	791	200
125m	5.3	2.9	1.7	1.2	-0.5	-0.7	-1.4	-1.2	776	200

171

115173

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	4S

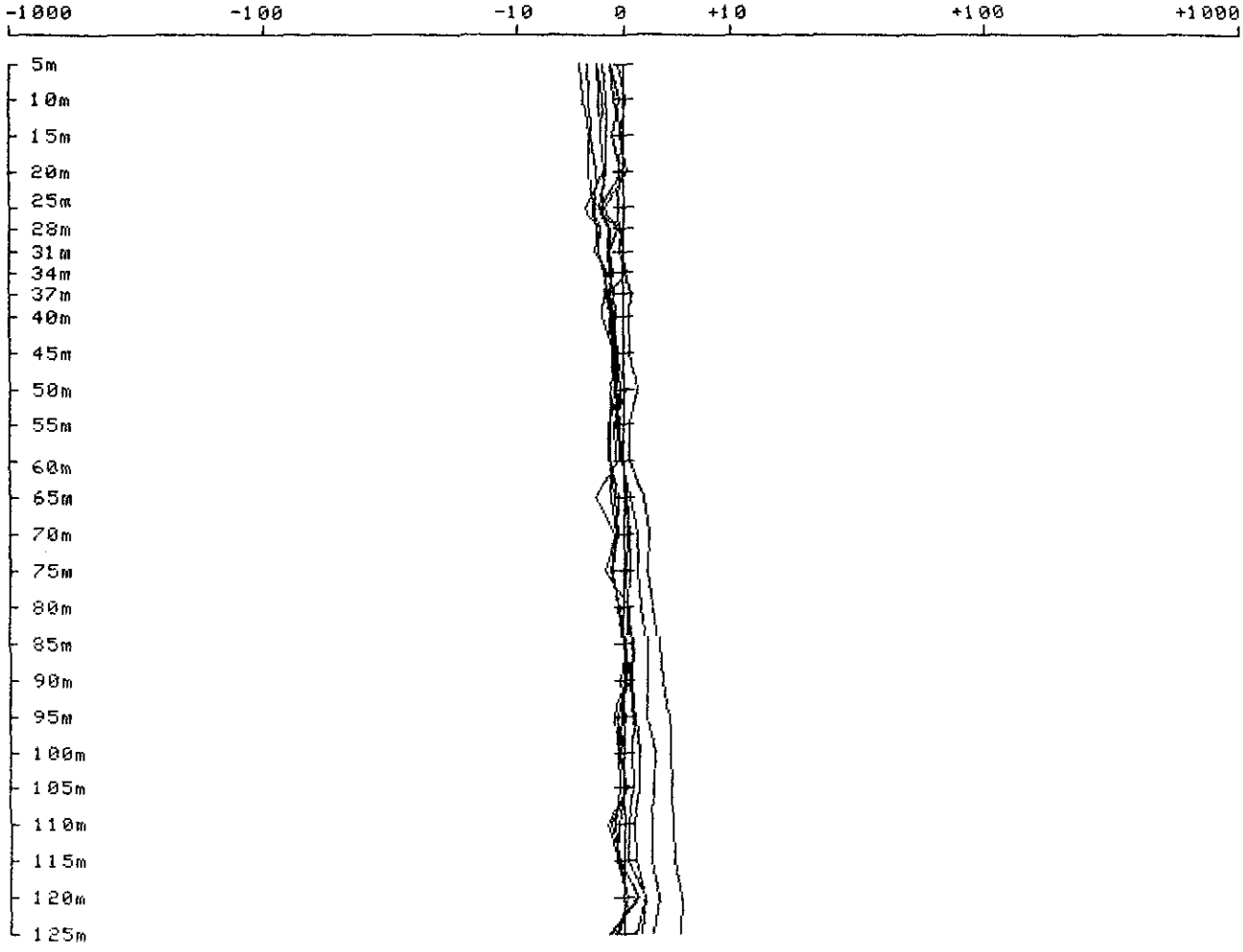
Time base: 10ms
Ramp time: 0.5ms

ZTS: 115
Gain: 200

Date: 17/02/85

Scale: 1:1000

5 cm



172

115174

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

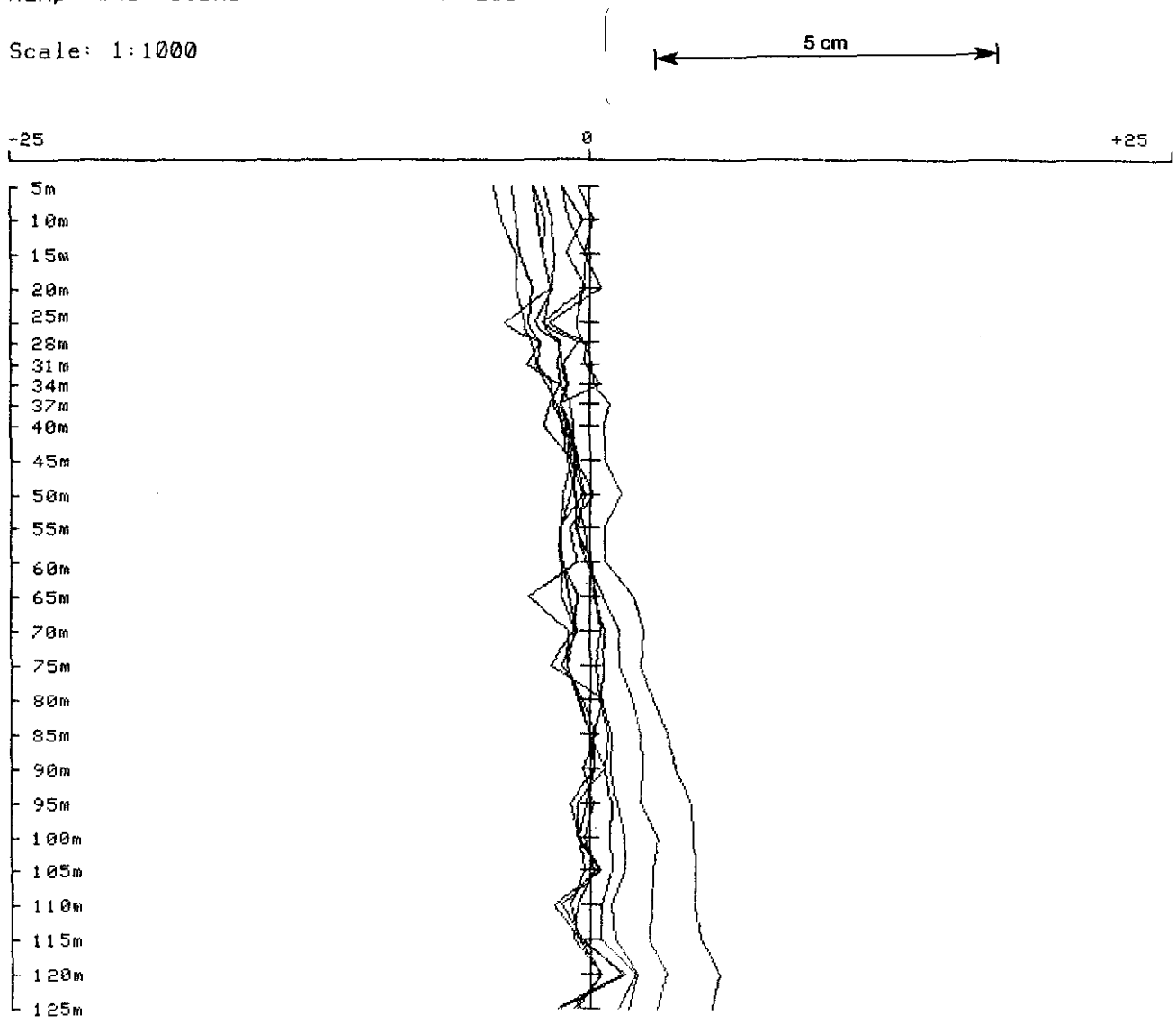
Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	4S

Time base: 10ms
Ramp time: 0.5ms

ZTS: 115
Gain: 200

Date: 17/02/85

Scale: 1:1000



173

115175

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	SW

Time base: 10ms
Ramp time: 0.5ms

ZTS: 114
Gain: 200

Date: 17/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	0.2	-5.9	-5.8	-4.1	-3.7	-2.2	-3.6	-1.9	-1242	200
10m	4.0	-2.2	-2.5	-1.9	-1.7	-1.4	-1.0	-0.5	-1242	200
15m	6.7	0.8	-1.1	-1.2	-1.6	-1.2	-0.8	-0.7	-1228	200
20m	6.8	1.6	0.1	-0.5	-1.5	-1.0	-1.3	-1.4	-756	200
25m	7.0	2.4	0.6	0.2	-0.8	-2.0	-0.5	-0.6	-42	200
28m	7.5	3.0	1.0	0.2	-0.2	0.1	0.0	0.9	73	200
31m	6.5	2.8	0.7	0.3	-0.5	-0.5	-1.3	0.2	197	200
34m	7.0	3.7	1.2	0.9	0.3	0.6	0.5	1.1	435	200
37m	9.9	5.0	2.0	1.3	0.2	0.7	-0.1	-0.1	576	200
40m	9.9	5.0	2.0	1.5	0.1	0.5	-0.3	-0.2	695	200
45m	8.4	4.5	2.3	1.4	0.2	0.0	-0.5	-1.8	839	200
50m	8.5	4.2	2.2	1.3	0.2	0.6	0.4	0.4	802	200
55m	8.7	4.8	2.0	1.0	0.0	0.5	0.6	-0.9	872	200
60m	8.6	4.8	2.2	1.4	-0.1	-0.3	-0.6	-0.5	908	200
65m	8.2	4.8	2.0	1.5	0.2	0.0	-0.9	-1.1	924	200
70m	8.2	4.7	2.2	1.0	0.4	-0.1	-0.4	0.3	927	200
75m	8.5	4.7	2.4	1.5	1.2	0.8	1.0	-0.2	924	200
80m	8.1	4.4	1.9	1.0	-0.2	-0.2	-0.8	-0.9	908	200
85m	8.5	4.9	1.8	1.2	0.0	0.4	0.1	0.1	885	200
90m	7.9	4.7	1.9	1.5	0.5	0.0	0.5	1.1	855	200
95m	8.0	4.6	1.8	0.8	0.0	0.2	-0.8	-0.2	818	200
100m	8.1	4.7	2.2	1.2	1.3	2.1	1.5	0.7	789	200
105m	8.3	4.4	1.9	1.7	0.6	0.8	-0.2	0.0	755	200
110m	8.5	4.7	1.9	1.4	0.8	1.0	0.1	0.1	724	200
115m	8.4	4.3	1.9	1.2	-0.1	-0.1	-0.9	-1.1	696	200
120m	8.6	4.5	1.8	0.9	0.2	0.3	-0.2	-0.1	665	200
125m	8.6	4.2	1.9	0.8	-0.2	-1.2	-2.3	-2.2	637	200

174

115176

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

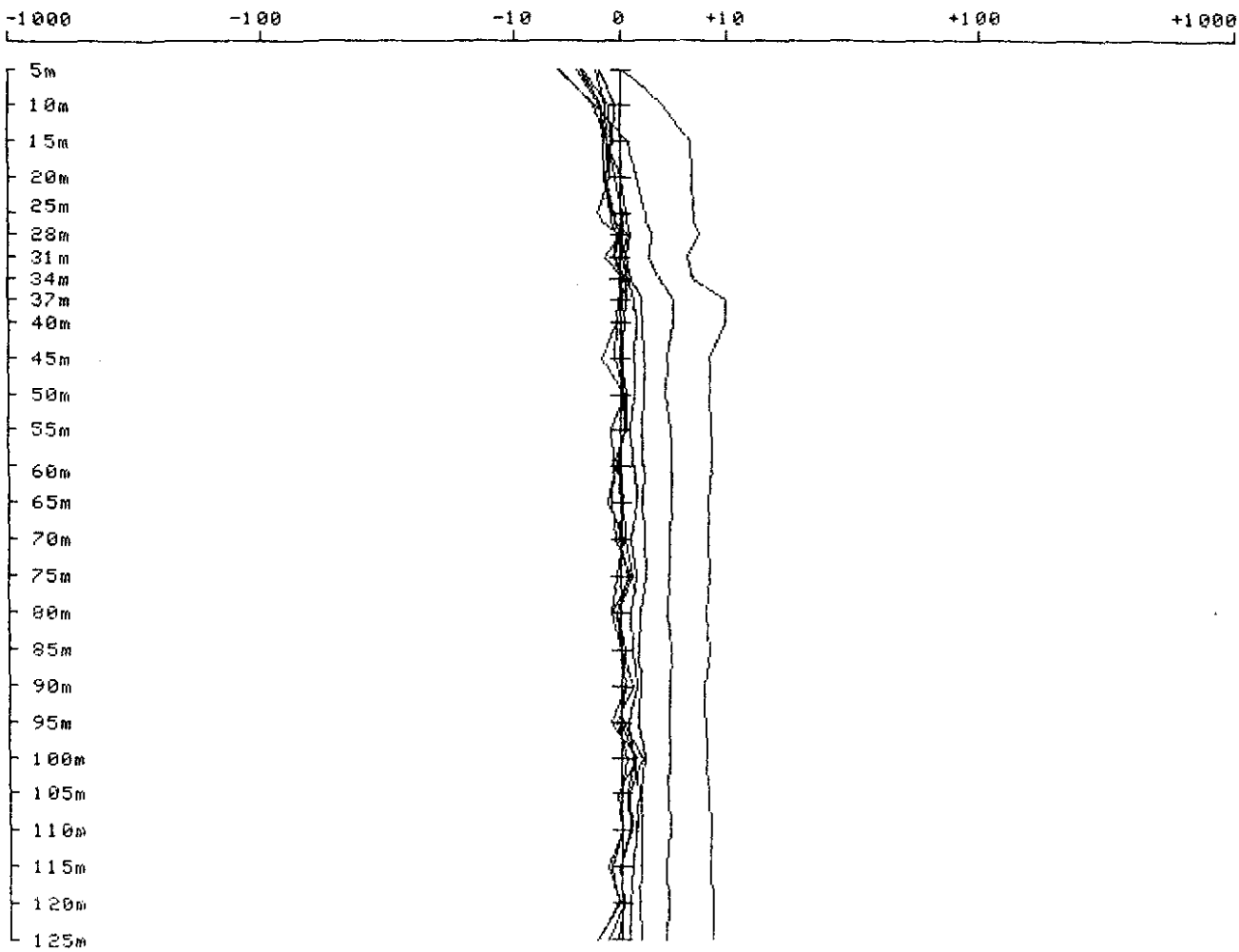
Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	SW

Time base: 10ms
Ramp time: 0.5ms

ZTS: 114
Gain: 200

Date: 17/02/85

Scale: 1:1000



5 cm

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

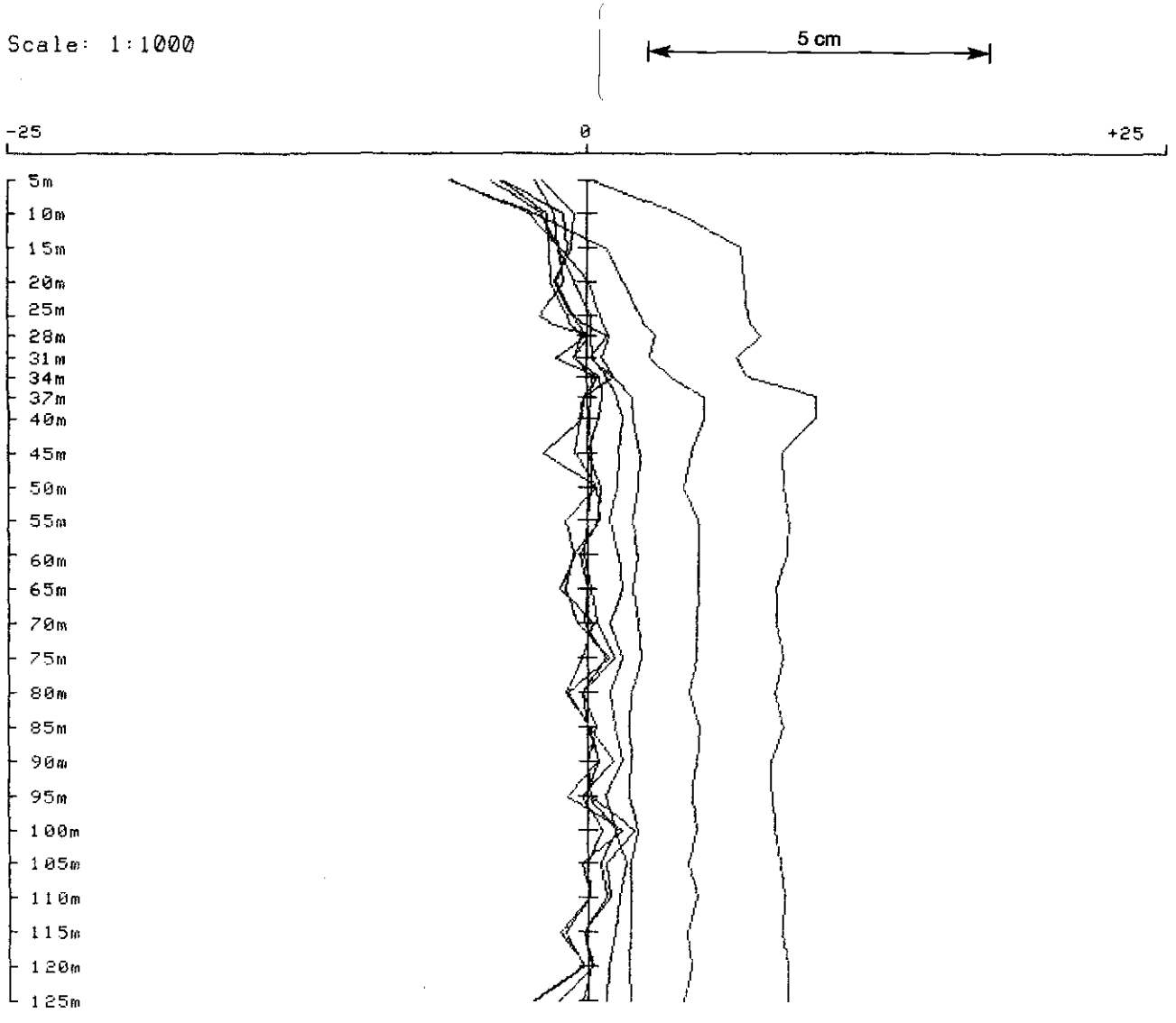
Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	SW

Time base: 10ms
Ramp time: 0.5ms

ZTS: 114
Gain: 200

Date: 17/02/85

Scale: 1:1000



CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid
MARIPOSA

Hole
DTM84-9

Tx Loop
6N

Time base: 10ms
Ramp time: 0.5ms

ZTS: 112
Gain: 200

Date: 17/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	0.8	-6.0	-4.2	-2.9	-2.5	-0.8	-1.3	0.8	-1241	200
10m	1.6	-4.6	-3.7	-2.3	-2.2	-1.0	-3.2	-1.9	-1241	200
15m	3.3	-2.9	-2.8	-1.7	-1.7	-1.0	-2.2	-1.3	-1241	200
20m	3.4	-2.1	-1.8	-1.2	-0.7	-0.1	-1.8	-0.5	-1241	200
25m	3.9	-1.1	-1.2	-0.7	-1.4	-0.7	-1.2	0.4	-1240	200
28m	5.0	-0.1	-1.0	-0.9	-1.8	-1.4	-2.0	-0.4	-1239	200
31m	3.6	-0.7	-0.9	-0.5	-1.2	-1.7	-2.1	-0.5	-1226	200
34m	4.1	0.0	-0.6	-0.5	-0.9	-0.8	-0.9	0.2	-958	200
37m	6.7	1.8	0.7	1.0	-0.1	-0.2	-0.6	-1.9	-631	200
40m	6.8	1.9	0.5	0.4	-0.9	0.2	1.1	1.0	-415	200
45m	5.7	1.9	0.8	1.0	-0.6	-0.4	0.6	0.2	-76	200
50m	5.5	2.0	0.7	0.5	-0.5	-0.5	-0.5	-0.2	183	200
55m	6.1	2.9	1.2	1.0	-0.2	0.2	-0.1	0.6	429	200
60m	5.4	3.0	2.2	1.2	0.2	0.4	1.2	-0.3	572	200
65m	5.1	3.2	1.5	1.2	-0.8	-0.4	-1.6	0.3	764	200
70m	4.9	3.2	1.5	0.9	-1.0	-0.9	-1.5	-0.7	880	200
75m	5.5	3.5	1.5	0.5	-0.2	-0.6	-1.7	-1.1	966	200
80m	4.3	3.1	1.8	0.3	-0.3	-0.6	-1.0	-1.3	1017	200
85m	4.6	3.3	1.3	0.9	0.2	0.5	-0.1	-0.1	1042	200
90m	4.8	3.2	1.7	0.8	-0.3	-0.6	-0.6	-0.4	1037	200
95m	4.5	3.2	2.0	1.0	0.3	-0.2	-0.6	0.6	1039	200
100m	4.6	3.5	1.9	1.3	-0.3	0.2	0.4	0.0	1002	200
105m	4.7	3.5	1.7	1.5	0.1	0.2	-0.2	-0.3	991	200
110m	4.9	3.3	1.8	0.9	0.2	-0.1	-0.2	0.3	961	200
115m	5.0	3.5	1.9	1.2	-0.2	-0.5	0.3	0.0	926	200
120m	5.2	3.2	2.0	1.2	-0.2	0.2	0.0	-0.1	885	200
125m	5.0	3.2	1.9	1.4	-0.3	-0.4	-0.6	0.6	846	200

177

115179

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

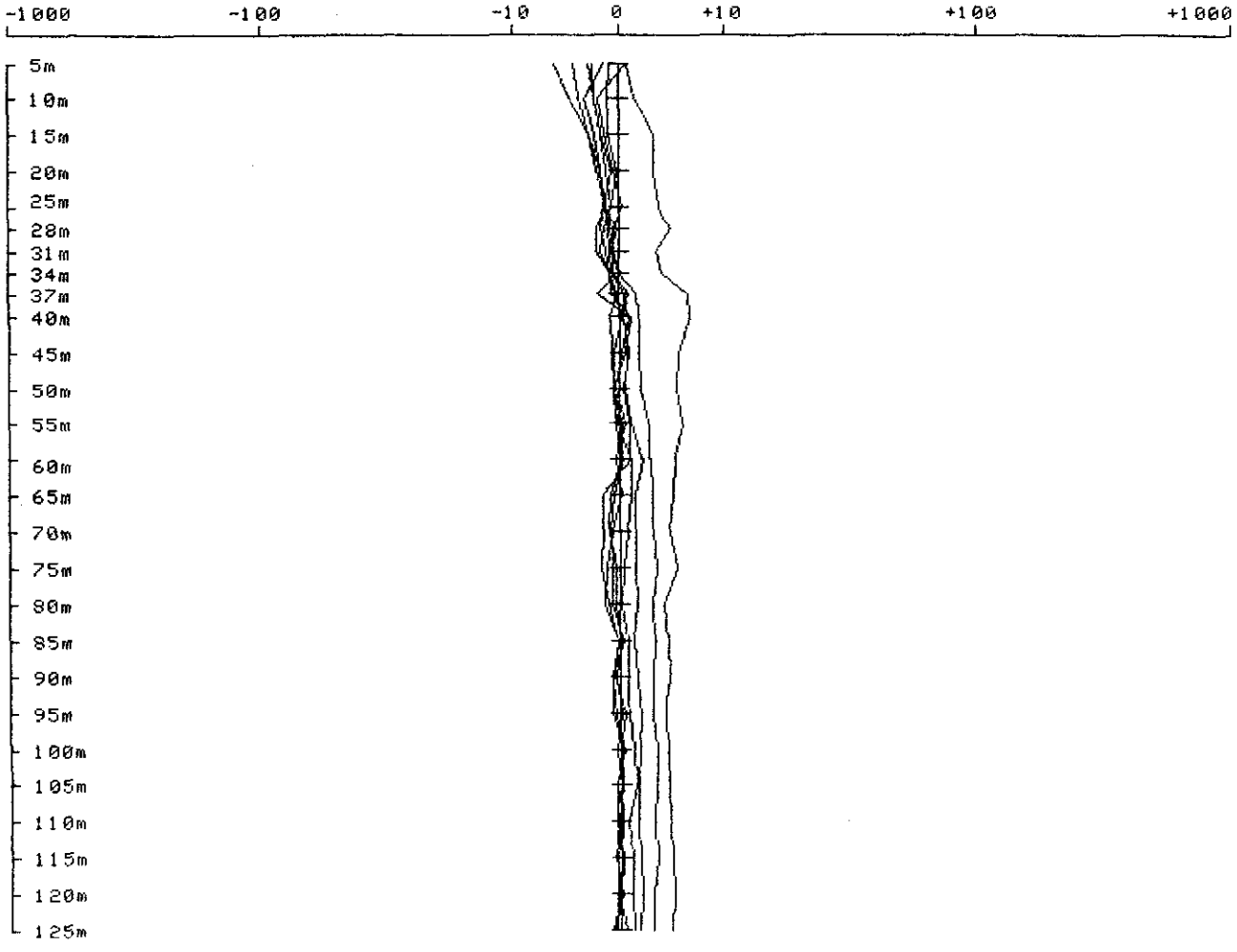
Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	6N

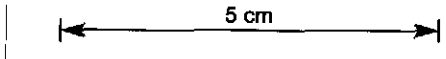
Time base: 10ms
Ramp time: 0.5ms

ZTS: 112
Gain: 200

Date: 17/02/85

Scale: 1:1000





178

115180

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

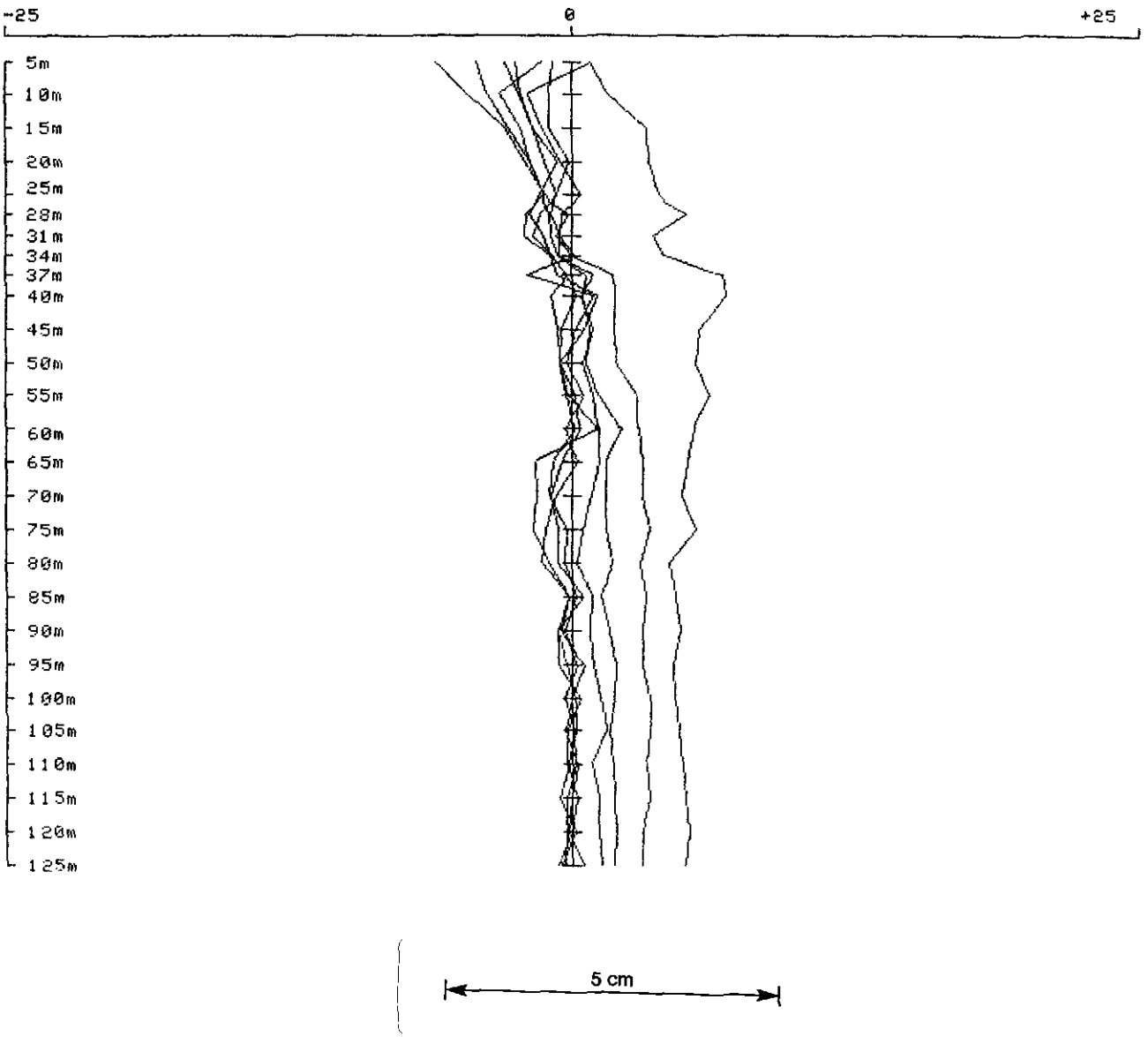
Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	6N

Time base: 10ms
Ramp time: 0.5ms

ZTS: 112
Gain: 200

Date: 17/02/85

Scale: 1:1000



CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
SUNCORNER	DTSC84-5	7

Time base: 10ms
Ramp time: 0.5ms

ZTS: 123
Gain: 200

Date: 18/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	32.4	11.1	0.7	-2.1	-2.9	-2.0	-3.3	-4.1	-1229	200
10m	40.5	16.8	4.7	0.6	-1.4	-1.5	-2.8	-1.0	-1191	200
15m	45.2	19.7	7.0	2.2	-0.9	-1.5	-1.5	-0.3	-1083	200
20m	45.1	20.7	7.9	2.9	-0.4	-0.9	-0.8	-0.5	-865	200
25m	49.4	22.6	9.1	3.6	0.1	-1.0	-0.7	-0.4	-156	200
30m	51.7	24.4	10.2	5.0	1.1	0.0	0.0	-0.2	604	200
35m	52.6	25.5	10.5	4.3	0.5	-1.5	-0.9	-0.4	951	200
40m	55.2	26.4	10.8	4.8	0.3	-0.9	-1.1	-0.2	1008	200
45m	55.6	26.6	11.3	5.1	1.6	-0.3	0.3	0.2	1046	200
50m	57.1	27.1	11.9	5.4	1.6	-0.1	-0.8	-0.5	1079	200
55m	58.4	27.9	11.8	5.2	0.5	-0.3	-0.4	0.0	1079	200
60m	57.5	27.2	11.6	5.0	1.0	0.3	-0.7	-0.4	1105	200
65m	59.7	28.1	12.1	5.1	1.2	-0.2	-0.1	0.0	1128	200
70m	60.8	28.4	11.4	5.1	1.2	-0.2	-0.2	-0.5	1151	200
75m	61.8	28.4	11.6	4.8	0.6	-0.3	-0.2	-0.5	1165	200
80m	60.7	27.4	11.0	4.9	1.2	0.0	-0.1	-0.4	1181	200
85m	62.3	27.8	10.8	4.4	0.5	-0.6	-0.9	-0.5	1186	200
90m	63.3	28.0	10.8	4.8	1.0	0.0	0.1	-0.2	1193	200
95m	64.9	28.3	10.4	4.0	0.1	-0.4	-1.3	-0.6	1196	200
100m	65.8	29.0	10.8	4.4	0.4	-0.5	-0.3	0.4	1198	200
105m	67.6	28.8	10.8	3.8	0.5	-0.8	-0.9	-0.6	1194	200
110m	69.0	29.4	11.0	4.2	0.7	0.1	-0.7	-0.7	1191	200
115m	71.6	30.3	10.9	4.2	0.4	-0.2	-0.4	-0.1	1192	200
120m	73.4	31.1	11.4	4.5	0.5	-0.4	-1.1	-0.9	1184	200
125m	75.4	31.6	11.6	4.6	0.7	0.0	-0.7	-0.3	1182	200
130m	76.4	32.0	11.4	4.1	0.0	-0.9	-0.8	-0.2	1172	200
135m	77.2	32.5	11.9	4.2	0.6	0.0	-1.1	-0.7	1159	200
137m	78.2	32.6	11.7	4.5	0.5	-0.4	-0.8	-1.0	1141	200

180

115182

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

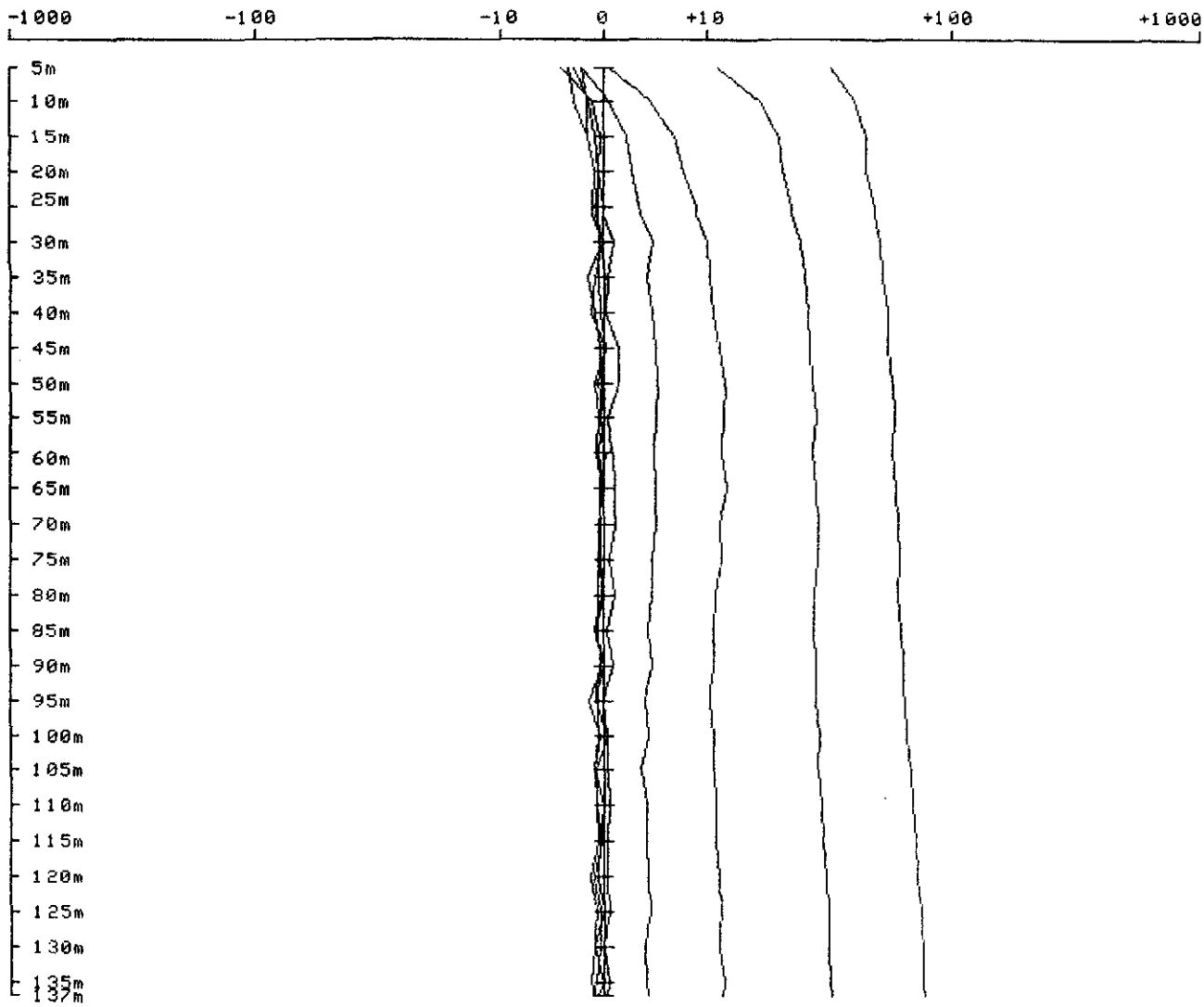
Grid	Hole	Tx Loop
SUNCORNER	DTSC84-5	7

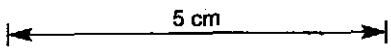
Time base: 10ms
Ramp time: 0.5ms

ZTS: 123
Gain: 200

Date: 18/02/85

Scale: 1:1000





CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
SUNCORNER	DTSC84-3	8

Time base: 10ms
Ramp time: 0.5ms

ZTS: 119
Gain: 200

Date: 18/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	122.4	113.1	79.5	58.3	40.2	25.6	16.3	11.6	1224	200
10m	130.0	119.6	78.6	51.8	30.2	16.5	11.1	5.2	1226	200
15m	137.2	132.2	88.1	58.2	33.3	17.6	8.0	5.4	1226	200
20m	145.1	138.4	90.0	57.4	31.6	15.0	7.2	3.9	1226	200
25m	124.6	114.4	74.0	47.3	26.3	11.3	3.3	2.3	1225	200
30m	92.4	84.2	54.1	34.0	18.3	7.1	1.3	-0.8	1226	200
35m	71.9	62.6	39.1	24.2	12.9	5.7	0.8	0.9	1225	200
40m	58.6	48.7	29.6	18.1	9.1	4.5	1.4	-0.6	1225	200
45m	49.0	39.2	23.4	14.1	6.6	3.0	0.0	-0.2	1225	200
48m	45.8	35.3	20.8	13.0	7.0	3.3	0.3	-0.2	1225	200
51m	43.5	32.9	18.3	11.4	5.7	3.4	0.8	0.5	1225	200
54m	39.0	28.9	16.3	10.1	5.1	3.1	0.7	1.3	1225	200
57m	39.2	27.7	15.3	9.2	4.4	1.7	0.6	-0.5	1225	200
60m	34.6	24.1	13.1	7.8	3.4	1.8	-0.5	-0.3	1225	200
63m	35.0	23.2	12.6	7.5	3.2	1.5	-0.6	-0.3	1225	200
66m	34.4	22.3	11.0	6.5	2.9	1.4	-0.5	0.0	1225	200

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115184

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

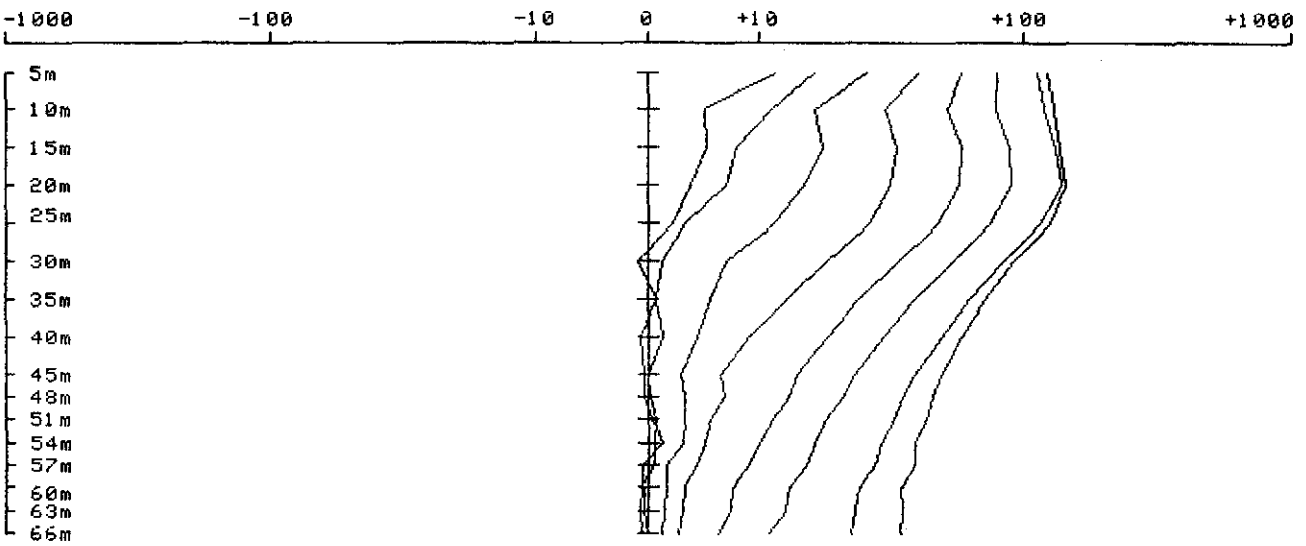
Grid	Hole	Tx Loop
SUNCORNER	DTSC84-3	8

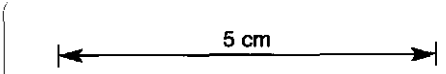
Time base: 10ms
Ramp time: 0.5ms

ZTS: 119
Gain: 200

Date: 18/02/85

Scale: 1:1000





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CRONE GEOPHYSICS Limited 115185

SURFACE PEM

Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L65300E	9

Time base: 10ms ZTS: 140 Date: 19/02/85
Ramp time: 0.5ms Gain: 200

STATION	COMPONENT	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8
7750N	Z	127.2	82.0	41.6	19.7	7.3	1.6	0.0	-0.3
	X	106.6	40.2	10.4	1.6	-0.7	-0.5	0.6	1.0
	Y	66.6	23.2	3.6	-1.0	-1.7	-0.8	-0.4	-0.2
7775N	Z	151.8	90.5	43.5	19.6	6.8	1.1	-0.4	-0.7
	X	139.2	48.4	11.5	1.0	-1.7	-1.4	-0.8	-0.4
	Y	81.3	26.3	3.5	-1.1	-1.6	-0.8	-1.1	0.3
7800N	Z	198.1	103.7	46.5	20.2	6.6	0.9	-0.4	-0.6
	X	146.5	49.4	11.7	1.2	-1.4	-1.0	-0.5	-0.4
	Y	82.8	23.3	2.1	-2.0	-2.2	-1.5	-1.2	-1.2
7825N	Z	225.8	110.9	47.9	20.5	6.6	1.1	-0.3	-0.4
	X	133.1	46.0	11.1	1.2	-1.3	-1.1	-0.1	-0.2
	Y	108.8	31.0	2.8	-2.5	-3.0	-2.4	-2.3	-3.4
7850N	Z	252.4	118.0	49.3	20.6	6.3	1.0	-0.2	-0.4
	X	112.3	41.1	9.9	0.9	-1.3	-0.9	-0.1	0.0
	Y	126.9	35.7	3.8	-2.3	-2.6	-1.4	-0.4	-0.1
7875N	Z	267.1	120.7	50.3	20.5	6.3	0.9	-0.1	-0.5
	X	98.3	37.4	9.2	1.0	-1.2	-0.7	-0.1	0.0
	Y	126.1	35.7	3.7	-2.9	-2.6	-1.3	-0.6	-0.3
7900N	Z	310.0	133.5	52.0	20.4	5.5	0.4	-0.7	-0.6
	X	94.0	36.9	9.5	1.5	-0.5	0.0	0.7	0.5
	Y	118.1	28.9	0.9	-3.7	-2.9	-1.4	-0.8	-0.3
7925N	Z	313.0	135.0	52.8	20.9	6.0	0.6	-0.6	-0.6
	X	63.3	28.8	7.3	0.5	-0.9	-0.5	0.3	0.2
	Y	128.7	34.1	2.1	-3.4	-2.9	-1.2	-0.8	-0.1
7950N	Z	347.2	144.7	54.6	20.4	5.0	-0.3	-1.0	-0.7
	X	11.9	16.3	5.5	1.2	0.2	0.2	0.5	0.4
	Y	130.2	34.4	1.8	-3.9	-3.3	-1.5	-0.8	-0.5
7975N	Z	333.2	142.8	54.8	20.8	5.6	0.3	-0.5	-0.5
	X	12.9	16.5	4.8	0.5	-0.7	-0.4	0.1	-0.1
	Y	109.4	29.8	0.8	-3.9	-2.8	-1.3	-1.1	-0.9
8000N	Z	302.0	136.1	53.6	20.6	5.8	0.5	-0.5	-0.6
	X	-13.1	6.9	2.7	0.7	0.0	0.0	0.1	0.0
	Y	91.3	26.4	0.2	-4.2	-2.9	-1.4	-0.8	-0.2
8025N	Z	320.6	144.0	56.0	21.2	5.8	0.2	-0.6	-0.7
	X	-34.2	4.0	2.2	0.4	0.2	0.3	0.5	0.1
	Y	117.0	30.9	0.8	-3.9	-2.4	-0.8	-0.6	0.3
8050N	Z	308.5	144.6	56.9	21.3	5.8	0.1	-0.5	-0.7
	X	-39.7	2.2	0.7	-0.6	-0.4	-0.3	0.1	-0.1
	Y	119.7	30.1	0.3	-4.2	-2.6	-0.8	-0.8	-0.1

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115186

CRONE GEOPHYSICS Limited
SURFACE PEM

Client
AMOCO

Grid
SUNCORNER

Line
L65400E

Tx Loop
9

Time base: 10ms
Ramp time: 0.5ms

ZTS: 140
Gain: 200

Date: 19/02/85

STATION	COMPONENT	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8
7750N	Z	196.3	100.1	46.5	21.1	7.5	1.8	0.0	0.0
	X	137.9	45.1	10.1	0.7	-1.7	-1.1	-0.7	-0.1
	Y	58.3	19.0	1.5	-2.4	-2.6	-1.2	-0.5	0.1
7775N	Z	217.7	105.4	47.1	20.9	7.0	1.6	-0.3	-0.4
	X	159.7	50.5	10.7	0.6	-1.9	-1.0	-0.9	-0.3
	Y	54.6	17.6	0.9	-2.7	-2.5	-1.1	-0.2	0.0
7800N	Z	291.2	121.9	49.3	20.2	5.9	0.6	-0.6	-0.6
	X	200.9	59.5	11.6	0.2	-2.5	-1.6	-1.0	-0.4
	Y	89.5	27.3	2.2	-3.1	-3.0	-1.3	-0.8	-0.4
7825N	Z	355.5	137.5	52.1	20.6	5.7	0.6	-1.0	-0.5
	X	182.5	55.3	10.8	-0.1	-2.5	-1.6	-1.2	-0.8
	Y	78.1	24.2	0.9	-3.6	-3.1	-1.5	-0.5	-0.1
7850N	Z	376.5	144.0	52.9	20.3	5.6	0.3	-0.6	-0.5
	X	144.2	47.4	9.8	0.1	-2.0	-1.3	-0.4	-0.2
	Y	63.0	20.8	-0.1	-3.6	-3.0	-1.1	-0.5	-0.2
7875N	Z	409.1	151.5	54.4	20.1	5.1	-0.1	-0.9	-0.8
	X	118.4	42.1	8.6	-0.4	-2.2	-1.3	-0.3	-0.2
	Y	43.7	14.8	-1.5	-4.2	-2.9	-1.3	-0.4	-0.5
7900N	Z	427.8	158.4	55.5	19.7	4.6	-0.2	-0.9	-0.7
	X	77.3	33.2	7.0	-0.6	-1.9	-1.0	-0.2	-0.1
	Y	30.1	11.2	-2.8	-4.6	-3.1	-1.0	-0.1	0.2
7925N	Z	425.4	158.9	54.9	19.2	4.2	-0.5	-1.0	-0.6
	X	37.7	22.8	5.0	-0.4	-1.4	-0.7	0.0	-0.2
	Y	20.8	9.9	-3.1	-4.6	-2.9	-0.8	0.0	-0.1
7950N	Z	414.8	158.7	55.5	19.3	4.6	-0.3	-0.7	-0.6
	X	13.3	18.0	3.8	-1.1	-1.6	-0.9	-0.2	0.2
	Y	10.5	4.6	-4.5	-4.3	-2.4	-0.4	0.3	0.3
7975N	Z	405.4	159.9	56.5	19.7	4.6	-0.5	-0.8	-0.9
	X	-17.8	10.8	2.6	-0.6	-0.7	0.0	0.3	0.1
	Y	4.5	0.9	-6.0	-5.2	-2.6	-0.8	-0.1	0.0
8000N	Z	397.4	160.8	57.4	20.1	4.9	-0.1	-0.7	-0.5
	X	-37.7	5.3	1.2	-0.6	-0.5	0.2	0.5	0.4
	Y	6.6	2.5	-5.3	-5.0	-2.6	-0.9	0.1	-0.1
8025N	Z	362.0	154.1	56.0	19.6	4.8	-0.1	-0.5	-0.5
	X	-56.4	-2.7	-0.8	-1.3	-0.9	-0.5	-0.2	-0.2
	Y	-10.6	-0.8	-6.5	-5.4	-2.8	-1.0	-0.2	-0.5
8050N	Z	328.3	147.5	56.0	20.4	5.5	0.7	-0.1	-0.6
	X	-69.1	-7.8	-1.7	-1.0	-0.2	0.0	0.4	0.0
	Y	-14.2	-1.1	-6.0	-5.4	-2.7	-0.9	0.2	0.0

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CRONE GEOPHYSICS Limited

115187

SURFACE PEM

Client
AMOCO

Grid: SUNCORNER
Line: L6550ØE
Tx Loop: 9

Time base: 10ms
Ramp time: 0.5ms
ZTS: 140
Gain: 200
Date: 19/02/85

STATION	COMPONENT	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8
7750N	Z	218.5	109.4	46.5	19.3	6.7	1.3	0.2	-0.3
	X	139.8	44.6	8.8	-0.2	-1.0	-0.7	-0.3	-0.1
	Y	44.3	16.4	-1.0	-4.5	-2.8	-1.4	-0.6	-0.4
7775N	Z	262.2	119.9	48.4	19.5	6.5	1.2	0.2	-0.4
	X	156.5	49.0	8.2	-1.4	-2.2	-1.3	-0.4	0.0
	Y	-8.8	0.8	-4.6	-4.6	-2.2	-0.8	0.3	0.3
7800N	Z	307.6	131.2	49.8	18.9	5.7	0.8	-0.1	-0.4
	X	147.6	47.1	9.1	0.0	-0.7	-0.2	0.6	0.3
	Y	-22.2	-1.5	-5.0	-4.7	-2.2	-0.8	0.2	0.2
7825N	Z	337.0	138.4	50.9	18.9	5.2	0.5	-0.5	-0.4
	X	139.9	46.2	8.3	-1.1	-2.2	-1.2	-0.4	0.1
	Y	-15.4	2.8	-3.7	-4.7	-2.5	-1.0	0.0	-0.4
7850N	Z	373.5	149.8	53.2	18.8	4.8	0.1	-0.3	-0.7
	X	111.4	40.7	7.1	-1.6	-2.4	-1.2	-0.2	-0.2
	Y	-70.4	-13.6	-6.7	-4.1	-1.3	-0.1	0.6	0.2
7875N	Z	379.6	152.0	54.0	18.9	4.9	0.1	-0.4	-0.5
	X	59.2	28.3	5.0	-1.2	-1.8	-0.8	0.1	-0.1
	Y	-45.8	-2.8	-4.4	-4.6	-2.2	-0.6	0.5	0.2
7900N	Z	373.6	153.3	54.5	19.0	5.0	0.3	-0.3	-0.5
	X	31.6	22.6	4.1	-1.3	-1.6	-0.7	0.0	0.2
	Y	-74.0	-14.4	-7.3	-4.5	-1.6	-0.1	0.6	0.4
7925N	Z	360.3	151.7	54.6	19.0	4.9	0.2	-0.3	-0.5
	X	5.6	13.9	2.8	-0.9	-0.8	-0.3	0.4	0.2
	Y	-70.8	-11.4	-6.5	-4.5	-1.7	0.0	0.9	0.7
7950N	Z	340.2	150.5	54.9	19.1	4.8	0.1	-0.4	-0.7
	X	-29.7	4.7	0.3	-1.3	-0.7	0.0	0.5	0.4
	Y	-71.2	-14.0	-7.2	-4.5	-1.5	-0.1	0.8	0.6
7975N	Z	322.4	147.8	54.8	19.3	5.1	0.3	-0.2	-0.4
	X	-35.5	3.0	0.5	-0.9	-0.5	-0.2	0.1	-0.4
	Y	-81.9	-17.6	-8.8	-5.1	-1.9	-0.5	0.4	0.0
8000N	Z	297.9	142.3	53.4	18.7	4.4	0.0	-0.7	-0.4
	X	-44.9	-2.1	-0.9	-1.1	-0.2	0.1	0.4	0.2
	Y	-72.4	-16.6	-8.4	-5.1	-2.0	-0.5	0.3	-0.2
8025N	Z	288.8	141.7	54.6	19.9	5.5	0.6	-0.2	-0.3
	X	-55.1	-6.7	-2.1	-1.1	0.0	0.3	0.7	0.2
	Y	-63.8	-16.7	-8.6	-5.1	-1.8	-0.4	0.5	0.4
8050N	Z	285.4	142.7	55.4	20.0	5.2	0.2	-0.7	-0.9
	X	-63.4	-11.3	-3.8	-1.8	-0.7	-0.1	0.1	0.0
	Y	-60.2	-17.7	-9.6	-5.5	-2.1	-0.4	0.3	0.1

CRONE GEOPHYSICS Limited

SURFACE PEM

Client
AMOCO

Grid
SUNCORNER

Line
L65600E

Tx Loop
9

Time base: 10ms
Ramp time: 0.5ms

ZTS: 140
Gain: 200

Date: 19/02/85

STATION	COMPONENT	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8
7700N	Z	173.4	101.7	44.9	18.8	6.4	1.0	-0.2	-0.6
	X	122.5	42.9	8.8	0.1	-1.1	-0.8	-0.4	0.0
	Y	-62.2	-21.0	-10.2	-5.4	-1.6	-0.3	-0.5	0.3
7725N	Z	200.9	109.3	46.6	19.0	6.3	1.1	0.1	-0.6
	X	116.2	40.8	7.4	-1.1	-1.5	-1.0	-0.3	-0.4
	Y	-58.0	-17.7	-9.5	-5.5	-1.9	-0.5	-0.7	0.1
7750N	Z	229.0	118.7	49.2	20.0	6.9	1.8	0.6	0.0
	X	121.5	42.7	8.4	-0.5	-0.8	-0.2	0.7	0.0
	Y	-74.0	-21.0	-10.0	-5.3	-1.5	0.0	-0.2	0.1
7775N	Z	264.5	128.7	50.2	19.0	5.7	0.7	-0.2	-0.2
	X	109.5	39.4	6.9	-1.3	-1.4	-0.5	0.5	0.3
	Y	-77.1	-19.7	-9.5	-5.6	-1.8	-0.3	0.5	0.0
7800N	Z	275.7	132.4	50.5	18.2	4.9	0.1	-0.6	-0.7
	X	107.9	39.6	7.3	-1.4	-1.8	-1.2	0.2	-0.2
	Y	-55.2	-10.8	-7.2	-5.3	-1.9	-0.5	0.4	0.1
7825N	Z	297.9	139.6	53.1	19.5	5.9	0.9	0.1	-0.2
	X	76.7	31.5	5.5	-1.4	-1.9	-1.2	0.0	-0.1
	Y	-108.2	-29.0	-11.2	-4.9	-1.0	0.2	0.6	0.1
7850N	Z	285.1	136.2	52.3	18.7	5.0	0.4	-0.1	-0.5
	X	36.5	20.0	2.1	-2.9	-2.5	-1.3	-0.2	-0.1
	Y	-97.5	-26.2	-10.7	-5.0	-1.1	0.1	0.7	0.2
7875N	Z	280.7	136.7	51.8	17.9	4.3	-0.5	-0.8	-0.8
	X	30.6	18.5	3.0	-1.7	-1.2	-0.6	0.5	0.2
	Y	-94.1	-25.6	-10.9	-5.4	-1.5	0.0	0.7	0.2
7900N	Z	260.5	132.8	51.8	18.6	5.3	0.7	0.1	-0.3
	X	10.3	11.4	0.9	-2.5	-1.6	-1.0	0.1	-0.1
	Y	-87.7	-27.2	-12.0	-6.0	-1.9	-0.3	0.5	0.1
7925N	Z	252.0	130.7	51.1	18.4	5.2	0.5	0.0	-0.2
	X	1.6	8.1	0.6	-1.8	-0.9	-0.5	0.2	0.0
	Y	-85.2	-26.1	-11.4	-5.8	-1.5	-0.1	0.5	0.0
7950N	Z	229.5	123.2	49.5	18.1	5.3	0.6	0.0	-0.3
	X	-16.7	-0.6	-2.2	-2.2	-0.7	0.1	0.8	0.1
	Y	-72.9	-25.2	-11.6	-5.9	-1.6	-0.1	0.8	0.3

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CRONE GEOPHYSICS Limited
SURFACE PEM

115189

Client
AMOCO

Grid
SUNCORNER

Line
L5790ØN

Tx Loop
9

Time base: 10ms
Ramp time: Ø.5ms

ZTS: 140
Gain: 200

Date: 19/02/85

STATION	COMPONENT	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8
5225E	Z	136.3	93.5	43.1	17.6	4.5	-1.0	-2.0	-1.9
	X	56.4	27.9	8.1	1.6	Ø.Ø	-Ø.4	Ø.2	-Ø.4
	Y	157.Ø	48.8	8.5	-Ø.7	-1.7	-Ø.8	-Ø.3	Ø.Ø
5250E	Z	211.7	110.9	48.1	20.3	6.4	Ø.9	-Ø.4	-Ø.5
	X	67.3	30.2	8.1	1.1	-Ø.7	-Ø.2	Ø.3	Ø.Ø
	Y	135.5	40.3	5.4	-1.9	-1.9	-Ø.9	-Ø.7	Ø.1
5275E	Z	232.4	113.8	48.4	19.9	6.3	1.Ø	-Ø.1	-Ø.5
	X	59.6	27.7	7.1	Ø.5	-Ø.9	-Ø.7	Ø.1	-Ø.1
	Y	108.2	33.1	2.9	-3.2	-2.8	-1.6	-1.6	-Ø.7
5300E	Z	310.Ø	133.5	52.Ø	20.4	5.5	Ø.4	-Ø.7	-Ø.6
	X	94.Ø	36.9	9.5	1.5	-Ø.5	Ø.Ø	Ø.7	Ø.5
	Y	118.1	28.9	Ø.9	-3.7	-2.9	-1.4	-Ø.8	-Ø.3
5325E	Z	284.7	124.Ø	50.2	20.Ø	6.2	Ø.8	Ø.2	-Ø.4
	X	62.7	28.2	7.4	Ø.9	-Ø.6	-Ø.4	Ø.2	Ø.1
	Y	98.8	29.4	2.1	-3.3	-2.2	-Ø.8	-Ø.3	Ø.1
5350E	Z	377.Ø	145.7	53.6	19.5	5.2	Ø.1	-Ø.7	-Ø.7
	X	84.9	35.Ø	8.4	Ø.7	-1.Ø	-Ø.3	Ø.6	Ø.4
	Y	98.2	26.7	Ø.3	-4.1	-2.7	-1.1	-Ø.1	Ø.Ø
5375E	Z	409.8	153.2	54.7	19.9	5.1	Ø.Ø	-Ø.5	-Ø.6
	X	88.6	36.8	8.2	Ø.1	-1.4	-Ø.8	Ø.1	Ø.1
	Y	78.3	24.2	Ø.1	-4.3	-2.7	-1.Ø	Ø.1	Ø.Ø
5400E	Z	427.8	158.4	55.5	19.7	4.6	-Ø.2	-Ø.9	-Ø.7
	X	77.3	33.2	7.Ø	-Ø.6	-1.9	-1.Ø	-Ø.2	-Ø.1
	Y	30.1	11.2	-2.8	-4.6	-3.1	-1.Ø	-Ø.1	Ø.2
5425E	Z	387.9	151.2	53.5	18.9	5.Ø	Ø.2	-Ø.3	-Ø.8
	X	58.1	27.7	5.7	-1.Ø	-1.3	-Ø.8	Ø.4	-Ø.1
	Y	6.2	7.1	-3.3	-4.7	-2.5	-1.Ø	Ø.2	-Ø.2
5450E	Z	365.9	148.5	52.6	18.4	4.5	Ø.1	-Ø.4	-Ø.6
	X	51.8	27.2	5.4	-1.1	-1.6	-Ø.7	Ø.2	Ø.Ø
	Y	-20.6	Ø.9	-4.6	-4.8	-2.3	-Ø.7	Ø.3	Ø.1
5475E	Z	380.7	154.Ø	54.2	18.6	4.6	Ø.Ø	-Ø.4	-Ø.7
	X	49.8	25.2	5.4	-Ø.5	-1.Ø	-Ø.5	Ø.5	Ø.2
	Y	-43.Ø	-2.7	-4.9	-5.Ø	-2.2	-Ø.8	Ø.7	Ø.3
5500E	Z	373.6	153.3	54.5	19.Ø	5.Ø	Ø.3	-Ø.3	-Ø.5
	X	31.6	22.6	4.1	-1.3	-1.6	-Ø.7	Ø.Ø	Ø.2
	Y	-74.Ø	-14.4	-7.3	-4.5	-1.6	-Ø.1	Ø.6	Ø.4
5525E	Z	328.2	144.8	53.2	18.8	5.2	Ø.6	-Ø.1	-Ø.3
	X	22.1	18.3	3.5	-1.1	-1.2	-Ø.3	Ø.2	Ø.Ø
	Y	-72.8	-14.7	-7.8	-5.3	-2.2	-Ø.7	Ø.3	-Ø.1
5550E	Z	309.2	143.3	53.6	19.2	5.4	Ø.7	Ø.Ø	-Ø.3
	X	13.1	16.5	3.Ø	-1.3	-1.Ø	-Ø.3	Ø.4	Ø.1
	Y	-83.8	-19.3	-9.1	-5.3	-1.9	-Ø.7	Ø.2	-Ø.2
5575E	Z	268.9	132.6	51.3	18.7	5.7	Ø.9	Ø.2	-Ø.4
	X	5.9	11.1	Ø.9	-2.3	-1.6	-Ø.8	Ø.1	-Ø.1
	Y	-79.2	-22.6	-10.1	-5.6	-1.7	-Ø.4	Ø.5	Ø.Ø
5600E	Z	260.5	132.8	51.8	18.6	5.3	Ø.7	Ø.1	-Ø.3
	X	10.3	11.4	Ø.9	-2.5	-1.6	-1.Ø	Ø.1	-Ø.1
	Y	-87.7	-27.2	-12.Ø	-6.Ø	-1.9	-Ø.3	Ø.5	Ø.1

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CRONE GEOPHYSICS Limited

SURFACE PEM

115190

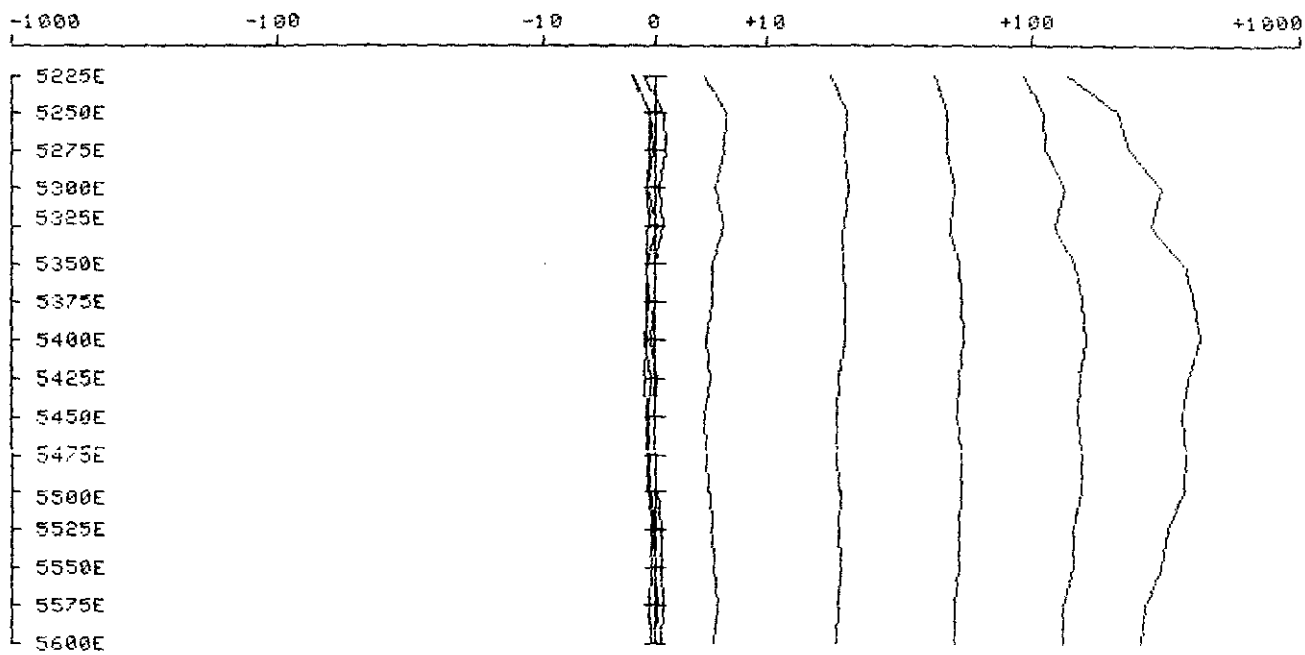
Client
AMOCO

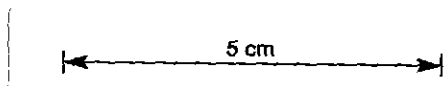
Grid	Line	Tx Loop
SUNCORNER	L57900N	9

Time base: 10ms	ZTS: 140	Date: 19/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:5000

VERTICAL Component dBz/dt





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CRONE GEOPHYSICS Limited

115191

SURFACE PEM

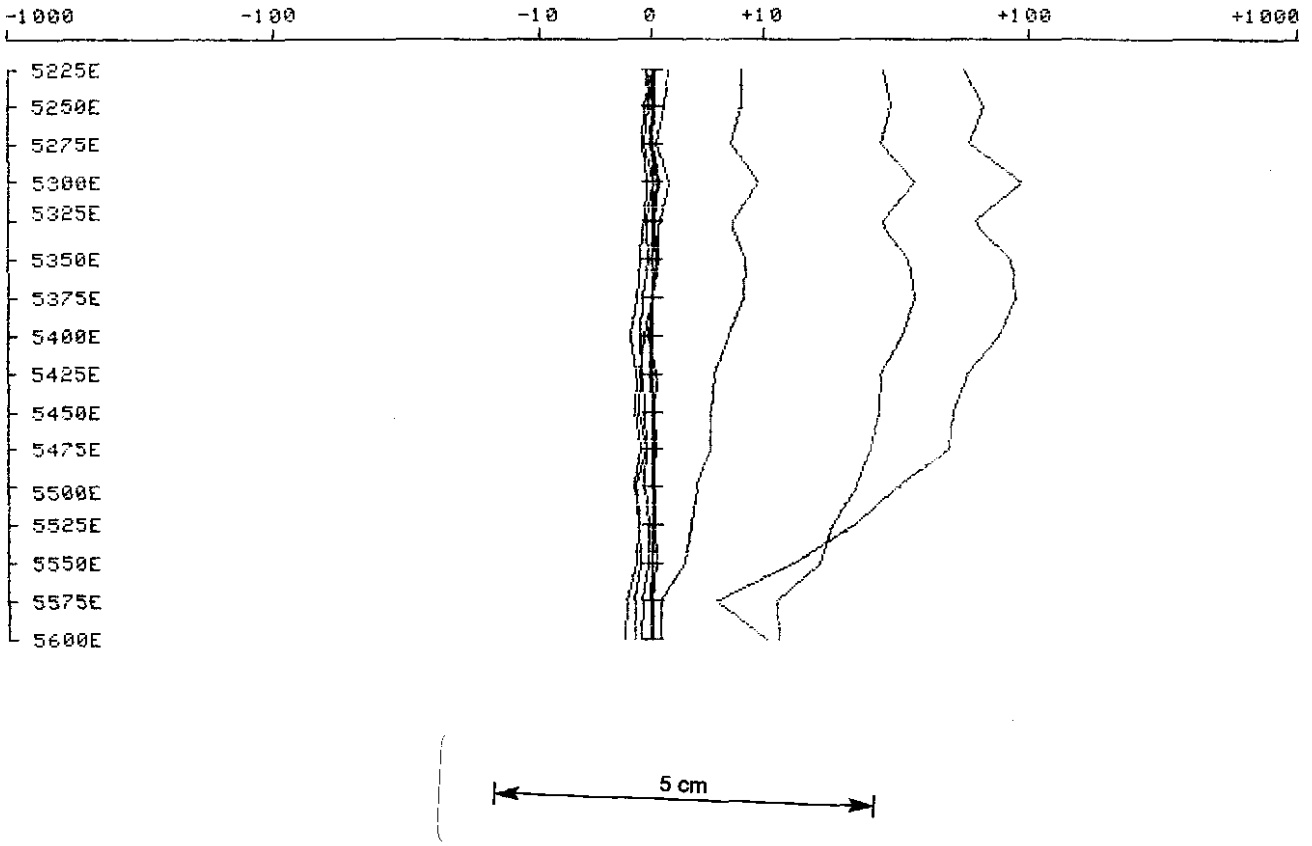
Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L5790ØN	9

Time base: 10ms	ZTS: 140	Date: 19/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:5000

IN-LINE HORIZONTAL Component dBx/dt



CRONE GEOPHYSICS Limited

SURFACE PEM

115192

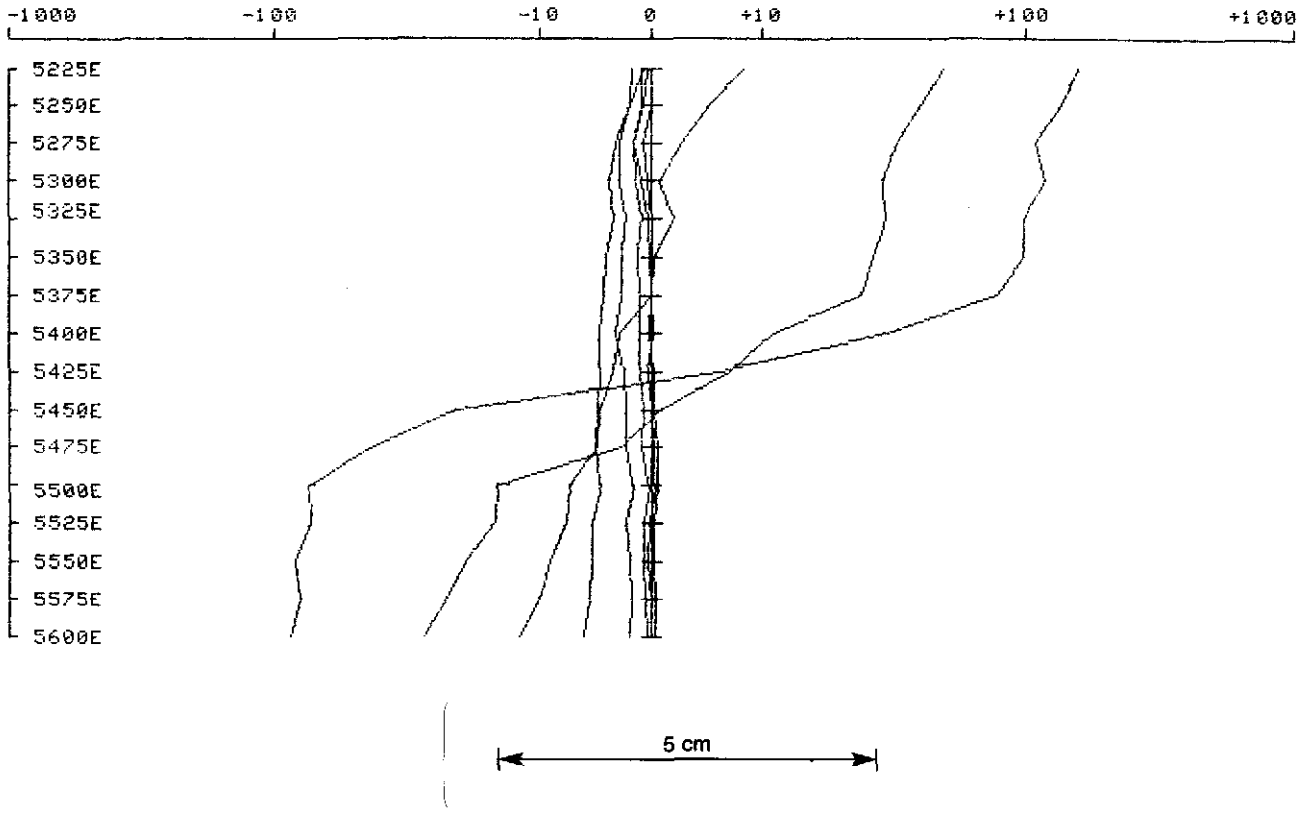
Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L57900N	9

Time base: 10ms	ZTS: 140	Date: 19/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:5000

CROSS-LINE HORIZONTAL Component dBy/dt



115193

CRONE GEOPHYSICS Limited

SURFACE PEM

Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L65300E	9

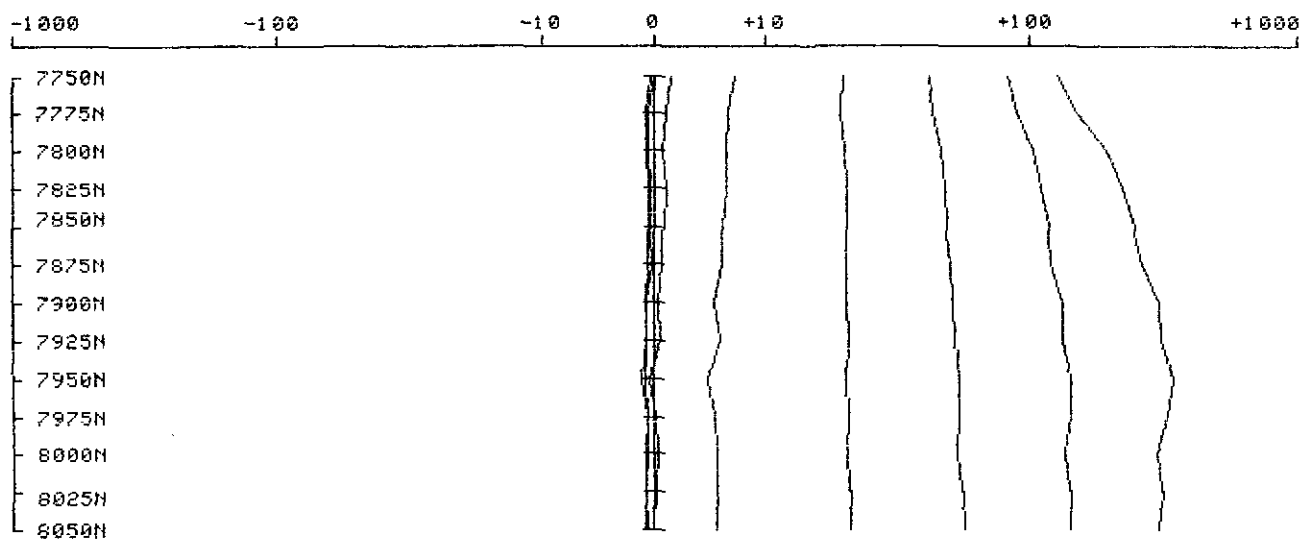
Time base: 10ms
Ramp time: 0.5ms

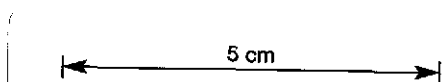
ZTS: 140
Gain: 200

Date: 19/02/85

Scale: 1:5000

VERTICAL Component dBz/dt





19c

CRONE GEOPHYSICS Limited

SURFACE PEM

115194

Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L65300E	9

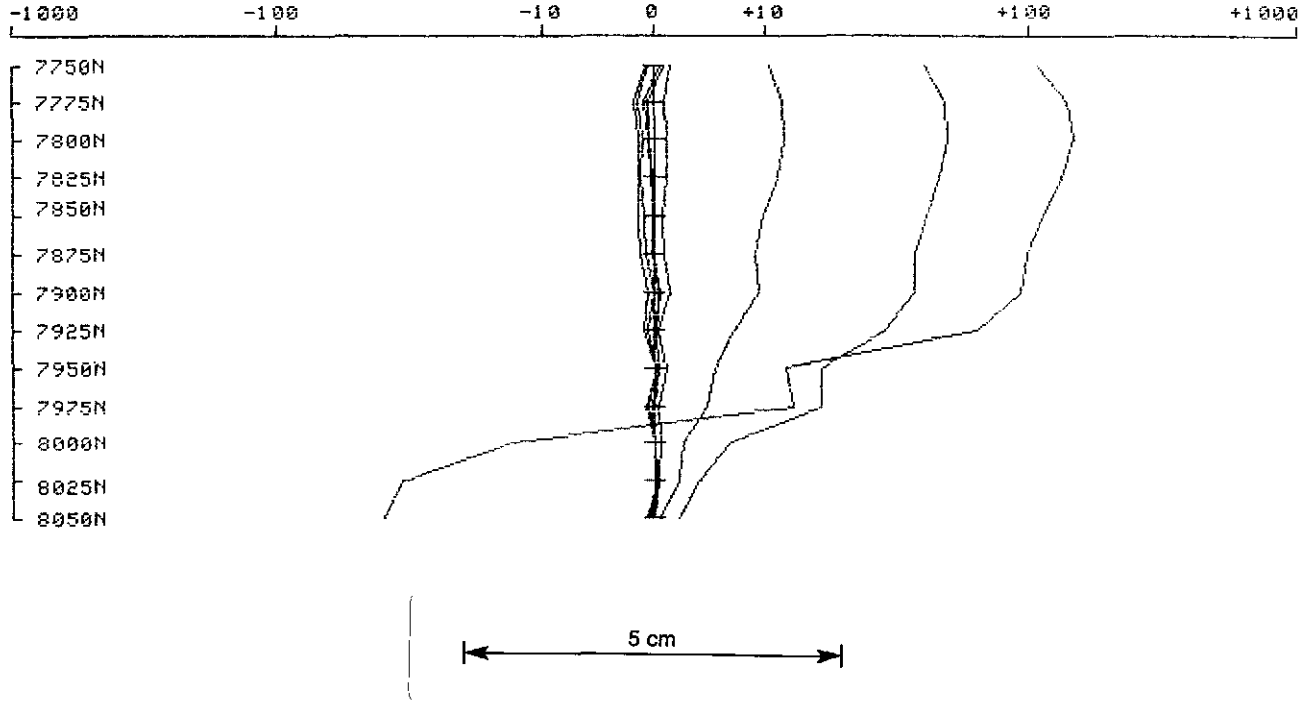
Time base: 10ms
Ramp time: 0.5ms

ZTS: 140
Gain: 200

Date: 19/02/85

Scale: 1:5000

IN-LINE HORIZONTAL Component dBx/dt



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CRONE GEOPHYSICS Limited

115195

SURFACE PEM

Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L65300E	9

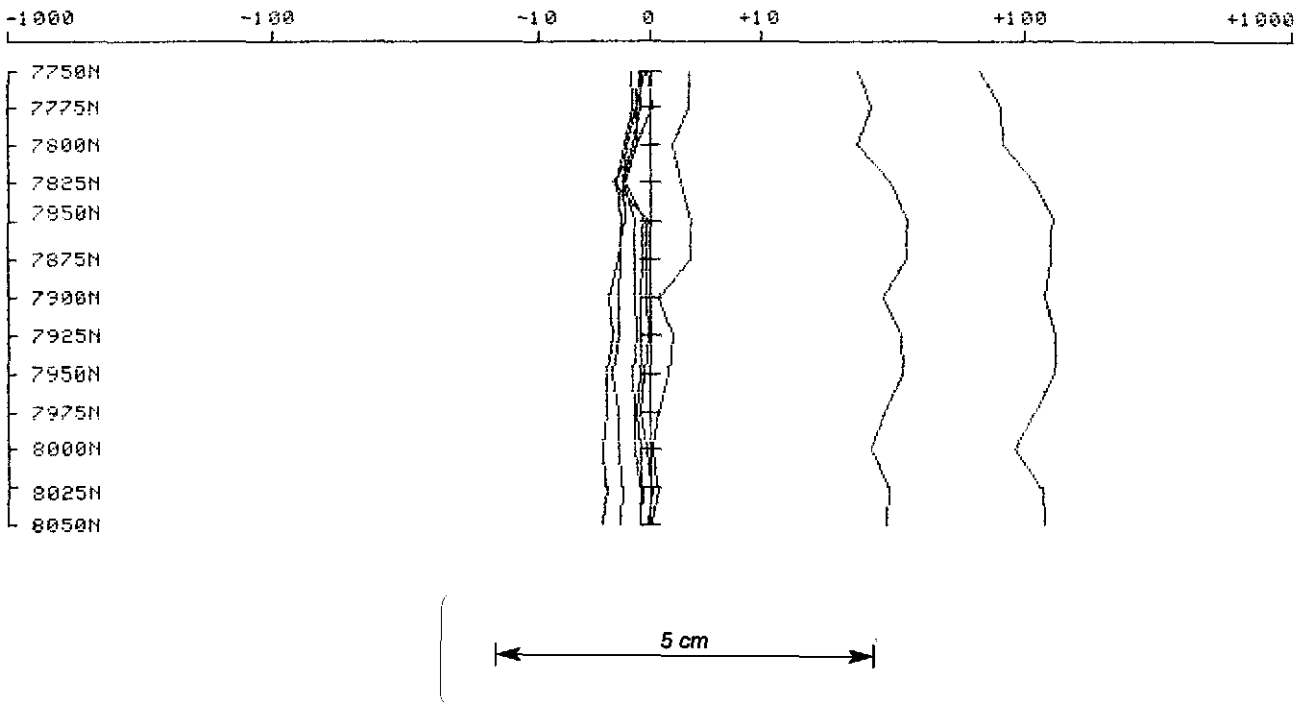
Time base: 10ms
Ramp time: 0.5ms

ZTS: 140
Gain: 200

Date: 19/02/85

Scale: 1:5000

CROSS-LINE HORIZONTAL Component dBy/dt



194

CRONE GEOPHYSICS Limited

SURFACE PEM

115196

Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L65400E	9

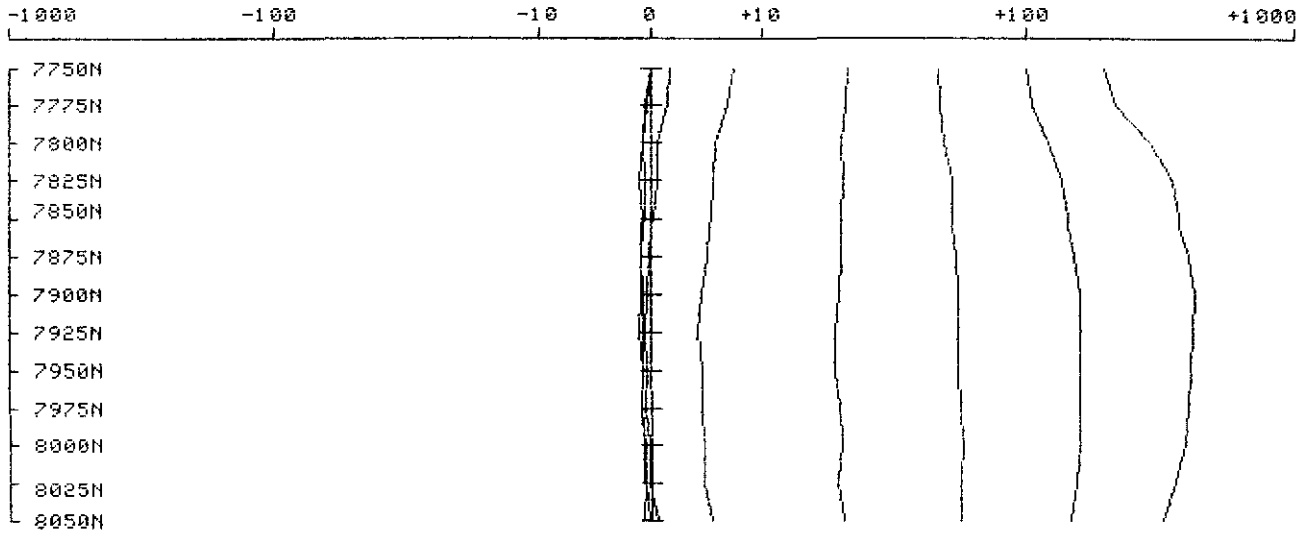
Time base: 10ms
Ramp time: 0.5ms

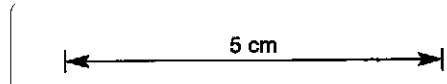
ZTS: 140
Gain: 200

Date: 19/02/85

Scale: 1:5000

VERTICAL Component dBz/dt





193

CRONE GEOPHYSICS Limited

SURFACE PEM

115197

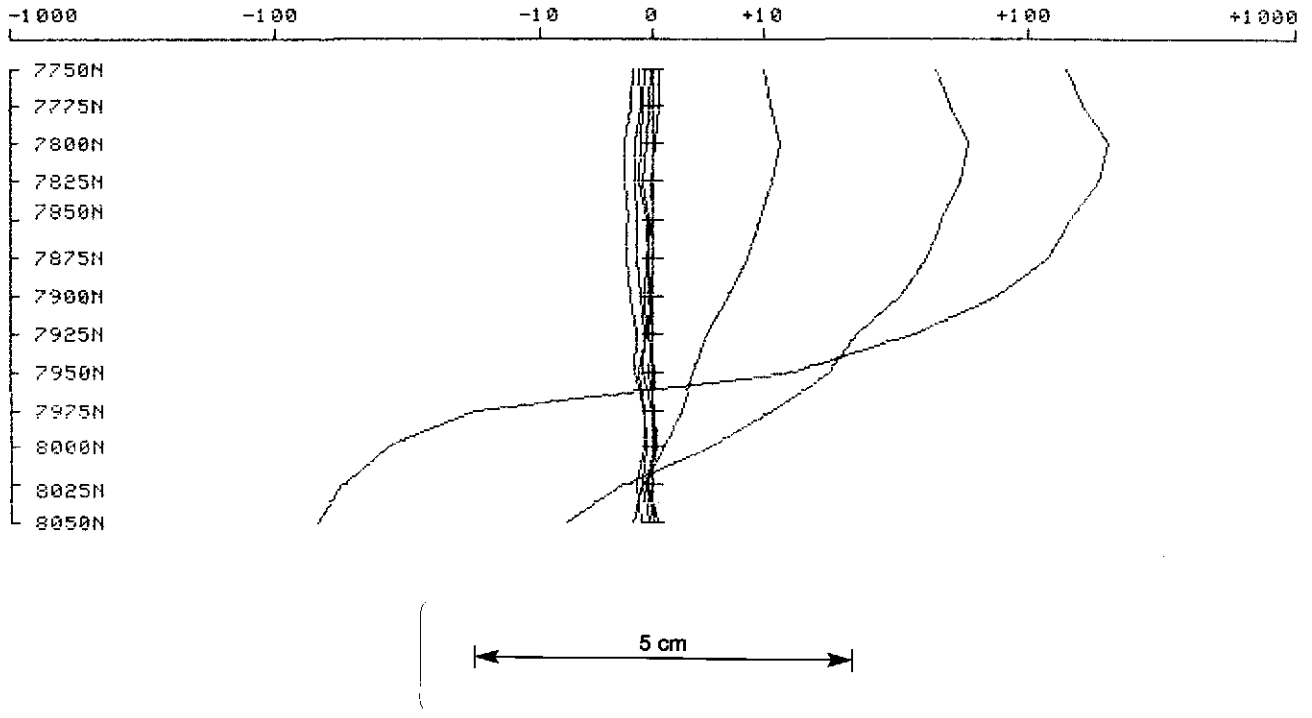
Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L65400E	9

Time base: 10ms	ZTS: 140	Date: 19/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:5000

IN-LINE HORIZONTAL Component dBx/dt



CRONE GEOPHYSICS Limited
SURFACE PEM

115198

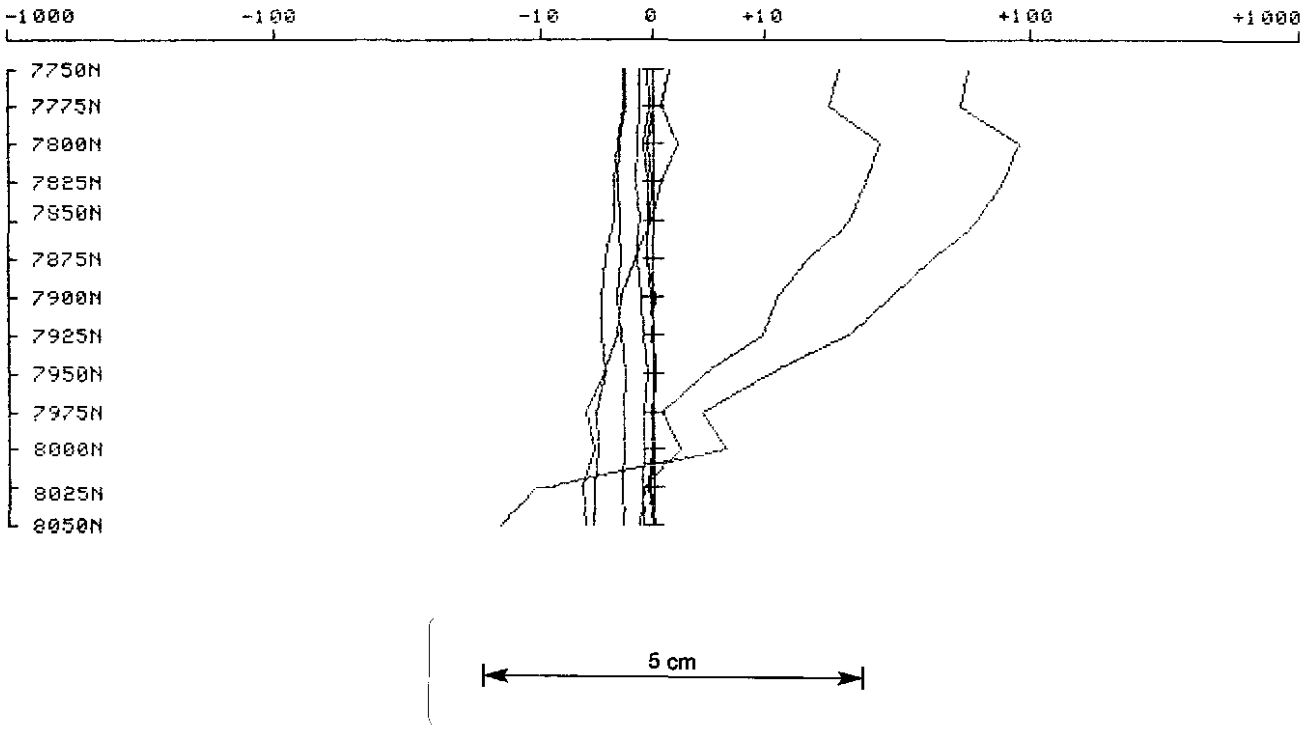
Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L6540ØE	9

Time base: 10ms	ZTS: 140	Date: 19/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:5000

CROSS-LINE HORIZONTAL Component dBy/dt



197

CRONE GEOPHYSICS Limited

SURFACE PEM

115199

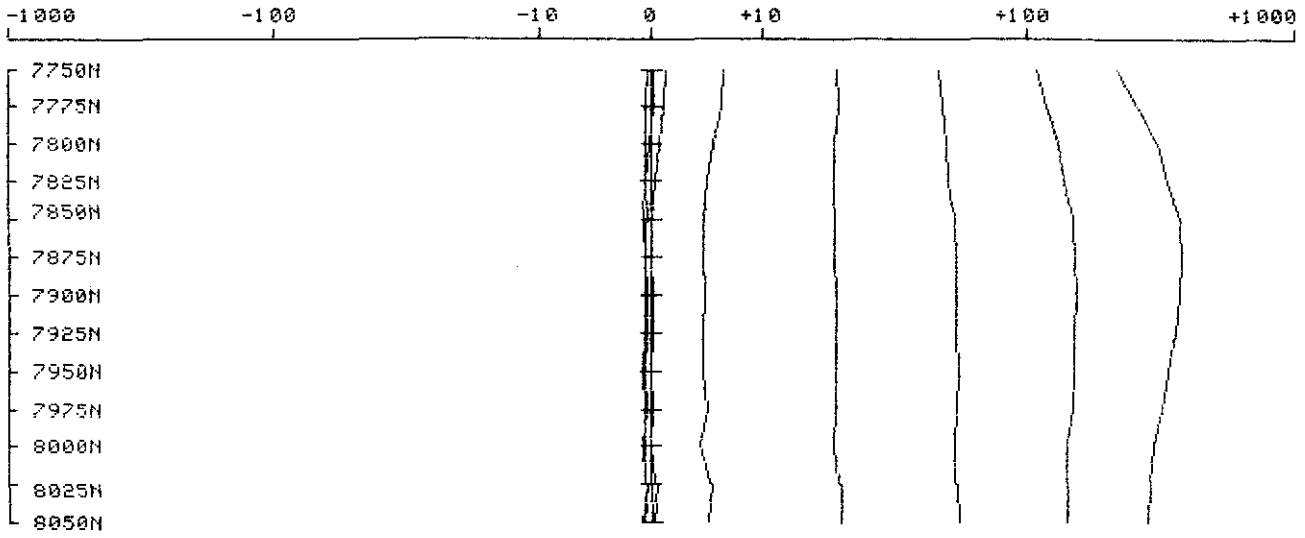
Client
AMOCO

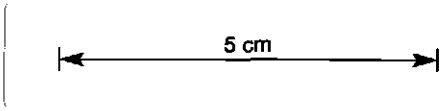
Grid	Line	Tx Loop
SUNCORNER	L65500E	9

Time base: 10ms	ZTS: 140	Date: 19/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:5000

VERTICAL Component dBz/dt





198

CRONE GEOPHYSICS Limited

SURFACE PEM

115200

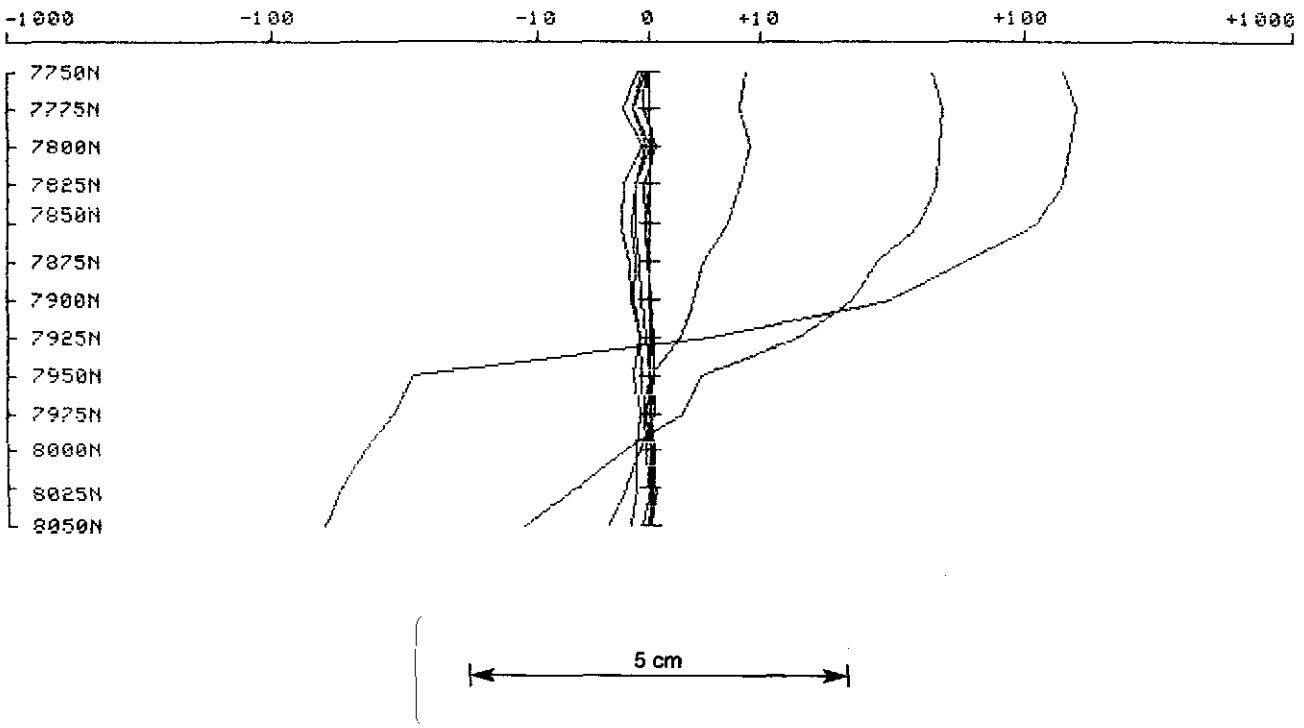
Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L65500E	9

Time base: 10ms	ZTS: 140	Date: 19/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:5000

IN-LINE HORIZONTAL Component dBx/dt



199

CRONE GEOPHYSICS Limited

SURFACE PEM

115201

Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L65500E	9

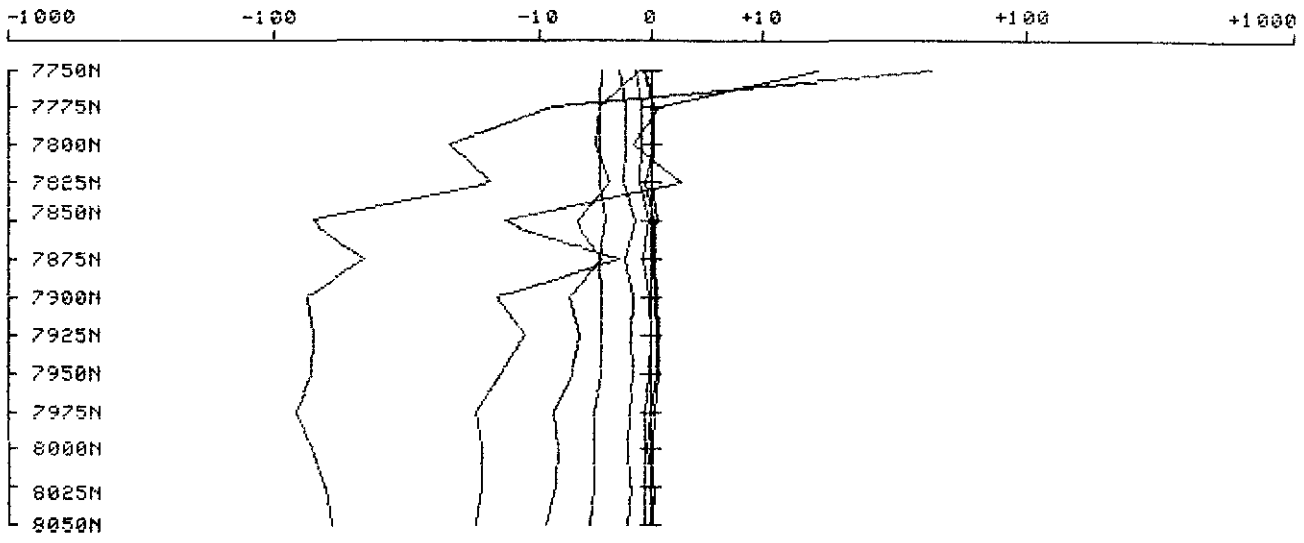
Time base: 10ms
Ramp time: 0.5ms

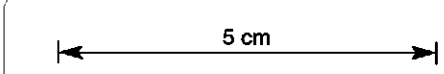
ZTS: 140
Gain: 200

Date: 19/02/85

Scale: 1:5000

CROSS-LINE HORIZONTAL Component dBy/dt





200

CRONE GEOPHYSICS Limited
SURFACE PEM

115202

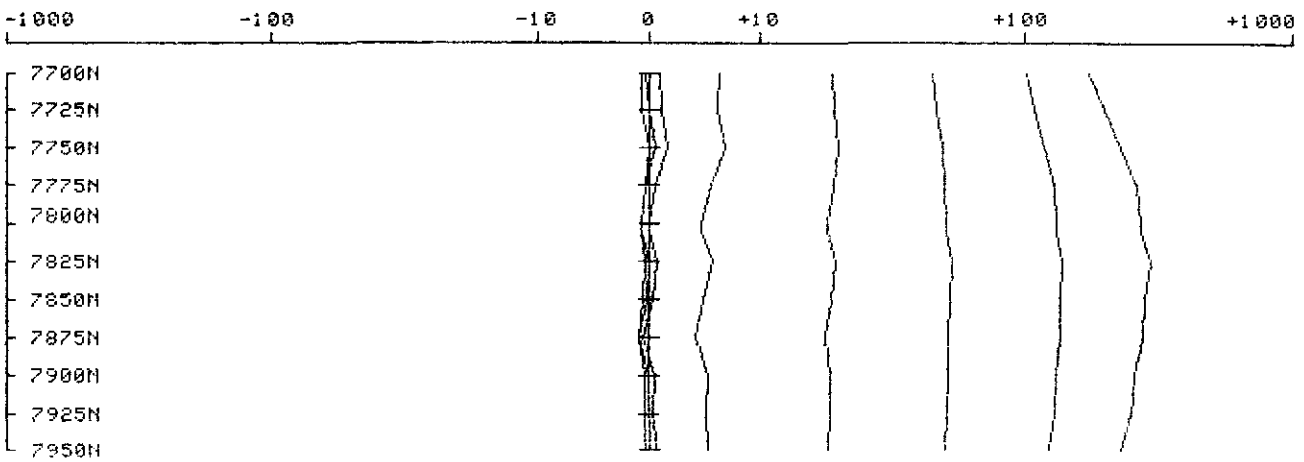
Client
AMOCO

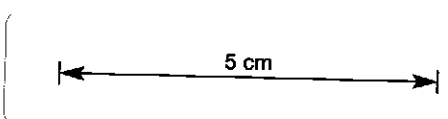
Grid	Line	Tx Loop
SUNCORNER	L65600E	9

Time base: 10ms	ZTS: 140	Date: 19/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:5000

VERTICAL Component dBz/dt





201

CRONE GEOPHYSICS Limited

SURFACE PEM

115203

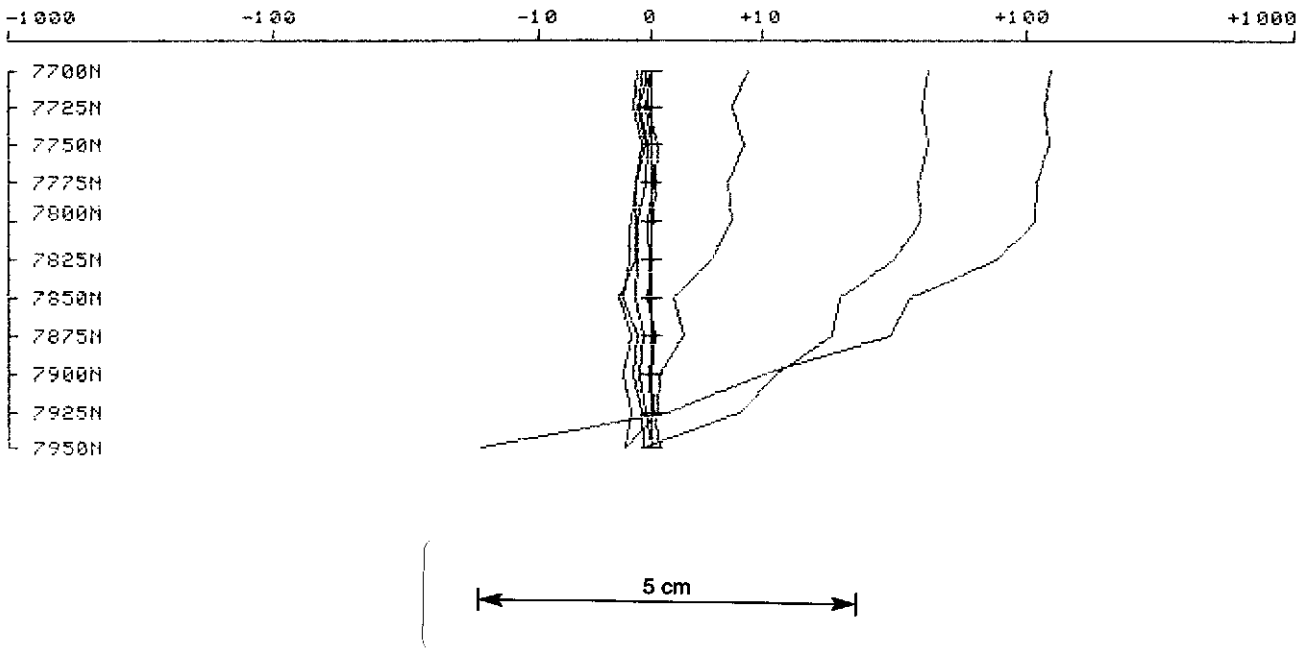
Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L6560ØE	9

Time base: 10ms	ZTS: 140	Date: 19/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:5000

IN-LINE HORIZONTAL Component dBx/dt



202

CRONE GEOPHYSICS Limited

SURFACE PEM

115204

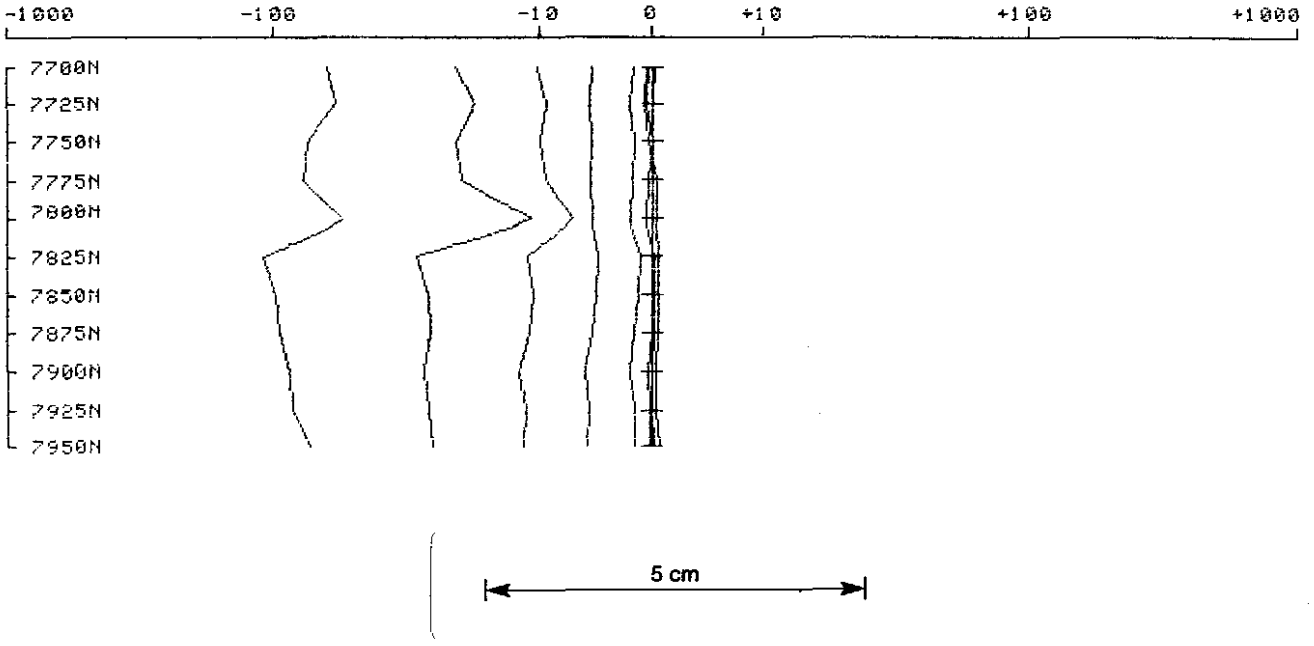
Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L6560ØE	9

Time base: 10ms	ZTS: 140	Date: 19/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:5000

CROSS-LINE HORIZONTAL Component dBy/dt



115205

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
SUNCORNER	HSC84-2	9

Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 19/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	409.3	186.7	73.4	28.2	7.9	1.4	0.3	0.9	1235	200
10m	415.8	185.6	70.9	25.9	6.1	0.3	-0.8	0.2	1235	200
15m	439.2	195.8	75.1	27.9	6.9	1.4	0.2	0.5	1235	200
20m	448.1	198.5	76.2	28.3	7.1	0.3	-0.2	-0.8	1234	200
25m	443.0	196.6	75.7	28.2	7.2	1.0	0.0	0.2	1235	200
30m	445.0	195.3	75.3	28.0	6.9	0.2	-1.2	-0.7	1235	200
35m	445.5	194.7	74.9	27.6	6.8	0.0	-1.8	-1.7	1235	200
40m	451.2	197.0	75.6	28.1	7.0	0.3	-1.1	-0.4	1234	200
45m	455.6	198.8	76.8	29.1	8.2	1.0	-0.2	0.0	1234	200
50m	459.9	198.9	76.5	28.4	7.2	0.6	-1.2	-0.7	1234	200
55m	453.8	196.8	75.1	27.7	7.0	0.3	-0.6	0.5	1233	200
60m	460.0	199.6	76.4	28.3	7.5	0.2	0.1	-0.5	1233	200
65m	459.0	197.2	75.5	28.0	7.7	1.1	0.2	1.0	1233	200
68m	464.8	200.1	76.9	28.6	7.3	0.1	-1.3	-0.5	1233	200

CRONE GEOPHYSICS Limited
BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
SUNCORNER	HSC84-4	9

Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 19/02/85

DEPTH	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	PP	GAIN
5m	302.6	164.6	76.5	35.2	14.0	5.4	2.5	0.8	1227	200
10m	309.0	165.0	75.5	34.2	12.6	4.5	1.2	0.4	1226	200
15m	311.1	164.7	75.2	33.7	12.9	3.5	1.2	-1.2	1226	200
20m	311.8	165.1	74.9	33.5	11.9	3.9	0.8	-0.2	1226	200
25m	317.8	165.6	74.3	33.4	11.3	2.5	-0.5	-1.0	1224	200
30m	323.3	168.5	75.2	32.8	11.0	2.6	-0.4	0.2	1225	200
35m	328.8	170.1	75.5	32.9	11.2	3.0	-0.1	0.0	1224	200
40m	331.7	170.4	75.6	33.2	11.2	2.9	0.7	-0.3	1225	200
45m	335.6	171.0	75.6	33.2	11.7	3.2	1.0	-0.6	1225	200
50m	339.8	173.9	78.2	35.0	12.2	2.2	-7.4	-10.8	1225	200
55m	345.1	174.7	76.3	32.6	11.0	2.5	-0.2	-2.2	1224	200
60m	348.3	175.4	76.3	32.6	10.6	2.5	0.3	-0.7	1224	200
65m	349.7	175.8	75.6	32.4	10.6	2.8	0.2	0.7	1224	200
70m	354.6	177.0	75.6	32.2	9.4	1.5	-0.6	-0.9	1223	200
75m	356.8	177.8	75.5	31.8	10.1	2.5	-0.8	-0.5	1223	200
80m	363.3	180.3	76.8	32.1	10.0	1.8	0.2	0.2	1223	200
85m	366.8	180.7	76.4	31.9	10.4	1.9	0.3	-1.2	1221	200
90m	369.3	181.7	76.3	31.6	9.8	2.0	0.6	0.6	1222	200
95m	368.5	180.3	75.0	30.5	9.1	1.4	-1.0	-0.4	1222	200
100m	374.8	182.4	75.9	30.7	9.0	1.8	-0.4	-0.5	1221	200
103m	377.2	183.1	76.0	31.0	9.3	1.7	0.2	-0.9	1221	200

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

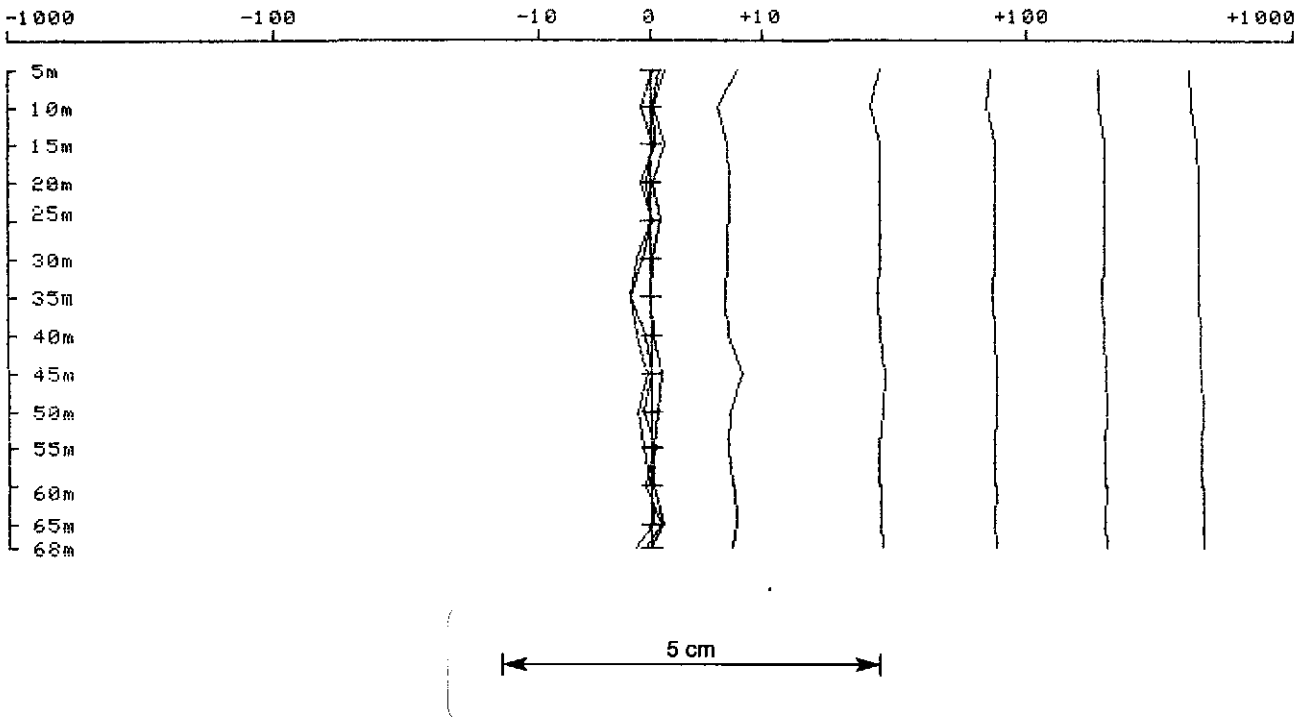
Grid	Hole	Tx Loop
SUNCORNER	HSC84-2	9

Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 19/02/85

Scale: 1:1000



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CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

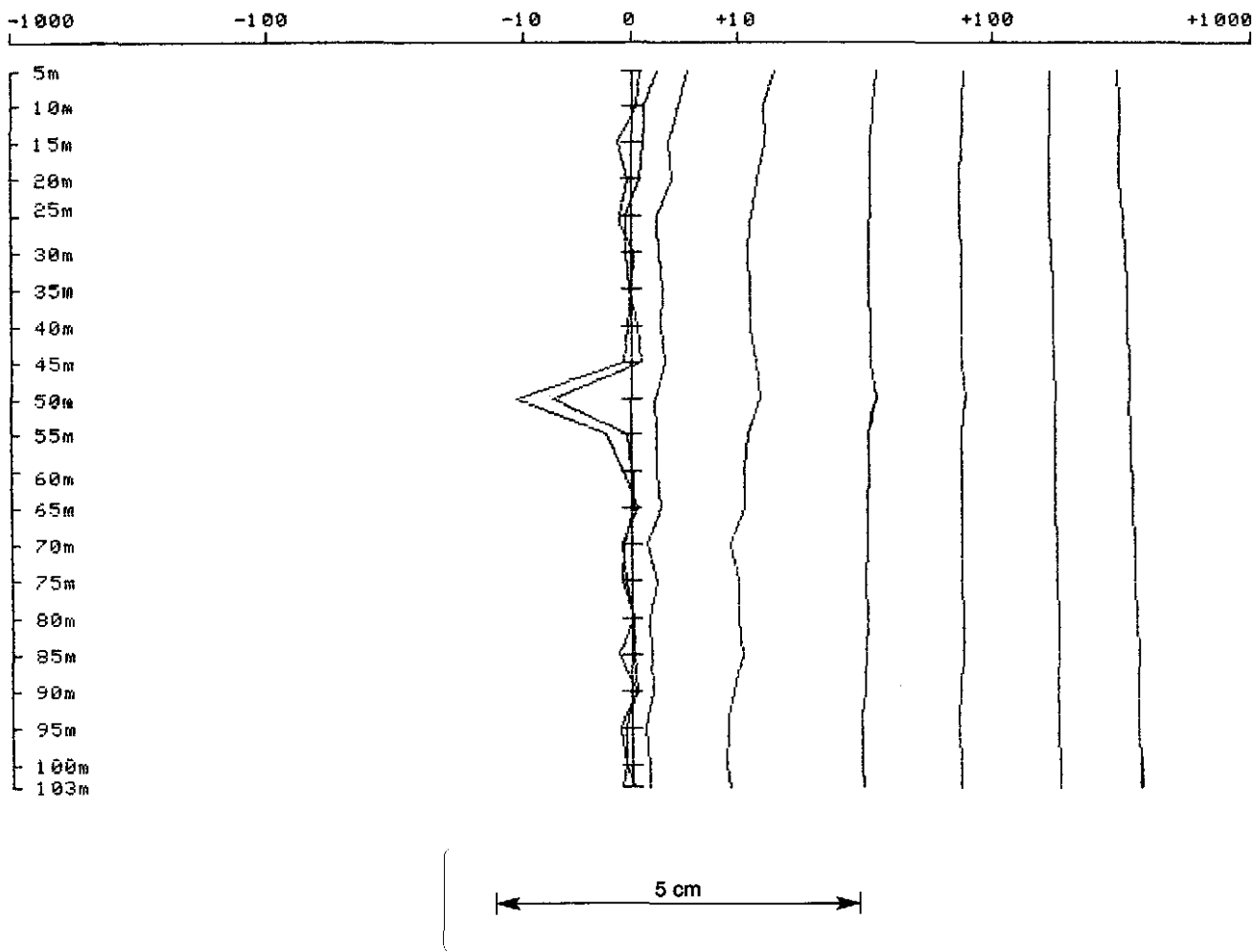
Grid	Hole	Tx Loop
SUNCORNER	HSC84-4	9

Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 19/02/85

Scale: 1:1000



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APPENDIX 5

REPORT ON GEOPHYSICAL SURVEYS OVER THE DUNDAS GRIDS, EL 15/76

by Mitre Geophysics

NOTE: LARGE FIGURES ARE FOLDED AND ACCOMPANY THE ENCLOSURES TO THIS REPORT

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MITRE GEOPHYSICS PTY LTD
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A REPORT ON GEOPHYSICAL SURVEYS OVER THE 'DUNDAS' GRIDS E.L. 15/76.

for

Amoco Minerals Australia Company

by

Dr J.R. Bishop

AM/MG85/09
July, 1985

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ABSTRACT

Amoco is exploring for carbonate-hosted lead-zinc deposits south-east of Zeehan under a joint venture agreement with CSR (part of E.L. 15/76). A portion of the limestone is covered by three grids: Black Jacks, Mariposa and Bannockburn.

In 1984, these grids were surveyed with VLF. Despite the cover, the results showed good agreement with the geology (defining the limits of the carbonates and some faults) and with the geochemistry.

In 1985, some drill holes were surveyed with PEM. Only one small anomaly was obtained (in DDH 9 at Mariposa). On the Bannockburn grid, the Sunny Corner area was surveyed with surface PEM. This also failed to locate any prospective targets.

In this report, the above surveys have been integrated with the previous geophysical surveys and the effectiveness of the techniques and the prospectivity of the grids assessed. Using Oceana as a (sub-economic) type deposit, gravity appears to be the most effective method, but a closer station spacing than the 50m used by Amoco is required, plus further processing of the data. A limited amount of petrophysical testing plus some field surveys suggest that the carbonates are chargeable, but that only a low IP contrast is likely between target and host. A much better resistivity contrast can be expected, although the absolute resistivity will probably not be low enough to make it an EM target.

Based on the volume of carbonates and the amount of drilling, plus the geophysical surveys*, Mariposa and, to a lesser extent, Bannockburn appear to have limited potential. However if the target mineralisation does not respond to the methods used (eg, EM37 at Mariposa) and effective techniques have only been partially utilised (ie, the gravity) then all three grids, plus the areas at the southern end of the E.L., still hold considerable potential for an economic sized deposit.

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* All three grids have strong bedrock geochemical anomalies, however these have been interpreted as being due to near-surface concentrating processes, rather than reflecting prospective sub-surface mineralisation.

INTRODUCTION

E.L.15/76 covers an area immediately to the east of the township of Zeehan on Tasmania's west coast (Figure 1). The licence is held by CSR, but part of it is being explored under a joint venture agreement between CSR and Amoco (referred to as the 'Dundas' joint venture), with Amoco managing the program.

The licence area is known to be mineralised (eg, the old Mariposa lead-silver workings) and is being explored for carbonate-hosted lead-zinc deposits.

This report describes the geophysical surveys carried out over the various grids in 1984 & 85 (mostly VLF and down-hole EM surveys) and integrates the results with those of previous surveys to draw some conclusions concerning the prospectivity of each grid.

EXPLORATION TARGET AND GEOLOGIC SETTING

The expected type of deposit on the Dundas grids is similar to the Irish carbonate-hosted base metal mines. That is, the lead-zinc would probably occur as epigenetic feeder zones including replacement veinlets, stockwork zones and cavity infilling; as well as syndiagenetic and stratiform ore.

The target area is a relatively narrow belt of Ordovician Gordon Limestone. The limestone is bounded on its western side by an unconformable contact with the Silurian Crotty Quartzite. On the eastern side, the contact is either with Ordovician Moina Sandstone or with (undifferentiated) Cambrian sediments of the Dundas Group. A number of faults cross the grids, at varying orientations.

The prospective areas are generally poorly exposed, the rocks having decomposed to clays or silts near the surface where they often form swampy button-grass flats. Quaternary gravel and sand deposits also cover some of the ground.

The nearby Oceana deposit has received a considerable amount of attention from Amoco and earlier explorers and can perhaps be considered as a (sub-economic) 'type' deposit for the area*. (Legge et al (1984) note that the deposit has several similarities to the Silvermines sedimentary-exhalative lead-zinc deposits in Eire.)

There have been a number of geophysical surveys carried out over Oceana; starting with the BMR in 1947 (Langron, 1966). These surveys showed that the mineralised zone was defined by the

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* Four million tonnes of 8% Pb, 2% Zn & 80g/t Ag is quoted by Legge et al (1984). The best intersection (in DDH 2) assayed 11m (true width) at 22.3% Pb, 11.7% Zn & 203g/t Ag.

gravity method, although not uniquely. Self potential (SP) and electromagnetic (EM) surveys were not effective, but magnetics may have helped to distinguish the 'genuine' gravity anomalies.

Amoco have tried several geophysical techniques over Oceana. These are listed in (approximate) chronological order in Table 1 and the results are briefly discussed below.

THE GEOPHYSICS OF THE OCEANA DEPOSIT

ELECTRICAL

A gradient array IP survey recorded semi-coincident resistivity lows (to less than 300ohm-m) and chargeability highs (to 24ms) over known mineralisation. Higher chargeabilities (to 29ms) were recorded to the south over (what is thought to be) unmineralised ground.

A dipole-dipole IP survey using 100m dipoles (plus a 200m dipole survey on 3700N) recorded lower resistivities and (mostly) higher chargeabilities over the mineralised zones. Both parameters indicated a shallow depth extent. Roxburgh and Jones (1980) suggested that the chargeability responses were due to "weathered dolomite or disseminated mineralisation" with the resistivity lows indicative of swampy conditions. Certainly a significant volume of sulphides, extending to depth, would have given a different type of response.

The best intersection of massive mineralisation had a true thickness of only 1/10th of the dipole width. It is likely that a reasonable definition of the deposit would have been obtained with smaller dipole spacings (with much reduced depth penetration), at least in the resistivity pseudosection (see petrophysical measurements below).

POTENTIAL FIELD

A gravity survey was carried out at a 100m line spacing (with some 50m detailing) using a 50m station interval. This defined a broad high to the (grid) south of the deposit. Comparison with the earlier BMR results (Bishop, 1983; figure 4) shows that a much more detailed spacing is required to define the deposit.

The grid was covered by magnetics and later the area north of 3500N was covered in more detail. Both sets of data are apparently affected by surface noise and the zone of mineralisation was not defined by either survey. This is in contrast to the BMR's results; presumably there was less metallic debris in the area during their survey. (It would be instructive to carry out a trial magnetic survey with the sensor placed at the top of a 5m pole.) A magnetic anomaly was recorded by the Dighem survey over the ironstone above the deposit. (The ironstone is oxidised siderite which is the Oceana's major gangue mineral.)

ELECTROMAGNETICS

Five lines of Dighem have been flown over the Oceana grid. One superficial response and two possible responses, also interpreted as being due to superficial sources but with coincident magnetic responses, were recorded over the northern end of the Oceana deposit (and were presumably due to clays rather than sulphides).

Three lines (including 3600N and 3700N which straddle the mineralisation in DDH 2) were surveyed using a moving-loop Crone Pulse EM (PEM) system with a Tx - Rx separation of 100m. A subtle inflection was recorded on 3600N, but this did not coincide with mineralisation.

A fixed-loop PEM survey was later carried out over lines 3300N to 3800N. The responses again did not coincide with any known mineralisation. (This survey was an early trial of fixed-loop, roving-receiver time domain EM and the results should not be regarded as final proof that the deposit is not a TDEM target. The size and position of the loop is not given in the report, but the leading edge is apparently well positioned at around 1200E.)

An EM37 survey was carried out in 1980 over 8 lines using a 50m station spacing. The loop edge was placed directly over the mineralisation at 1400E. More pronounced 'loop edge' effects were recorded in the northern half of the survey; ie, over the mineralisation, but this was not consistent. Experience gained in this method since 1980 shows that more interpretable results would be obtained if the loop's leading edge were placed some 250m-300m away from the deposit.

The unprocessed results from a recently conducted controlled source audio-magnetotelluric (CSAMT) survey suggest that the deposit could be detected using small (12.5m) dipoles. The pseudosections also suggest limited depth extent. (The processed results from this survey will be included in a subsequent Amoco report.)

PETROPHYSICS

A limited number of petrophysical measurements were made on core from two drill holes. The results are given in Table 2. These indicate that the ore is significantly denser than the host rocks, but is less chargeable. Galvanic resistivity measurements gave values of 0.2 and 2.0 ohm-m for ore. Inductive (ie, electromagnetic) measurements would probably give values an order of magnitude more conductive. That is, the massive sulphide mineralisation should be a good (but not excellent) EM target. Despite these results (and my comments on the fixed-loop EM surveys), I believe that the lack of response from the moving loop PEM survey, over relatively shallow ore, is sufficient proof that the Oceana deposit is not an EM conductor (ie, the sulphides are not electrically continuous). The results of down-hole EM surveys were also disappointing and support this conclusion (a PEM survey down DDH 8 failed to detect, at a distance of 60m, the 11m of massive sulphides intersected by DDH 2).

CONCLUSIONS

From the above one may draw the following conclusions. A relatively shallow deposit should give a recognisable gravity response, provided that the station density is high enough. It is possible that a larger, higher-grade deposit than the Oceana would give an EM response (though probably not if the higher grade were largely due to zinc sulphides). It is also possible that a subtle magnetic response would be associated with a deposit. It would give an IP anomaly, but this might not be distinguished from the responses of the host rocks. Resistivity, also measured in an IP survey, should be strongly anomalous over a potentially economic deposit. Thus metal factor (IP effect divided by resistivity) should be a diagnostic parameter.

Although (even economic) mineralisation may not be conductive enough to generate sufficiently anomalous secondary currents in the deposit, a mineralised zone should have a sufficient resisitvity contrast to cause significant current gathering. It is suggested that various experimental surveys could be tried which would take advantage of this phenomenon. Magnetometric resistivity (MMR), which injects the current along, rather than across strike, is suggested as well as grounded loop EM surveys. Such methods may be expected to respond to large-scale conductors such as faults and contacts, however a potential target should have better electrical properties.

BLACK JACKS

EXPLORATION HISTORY

The geophysical surveys carried out prior to 1978 were evaluated by Bishop (1983) (and are listed, with comments, in Table 3). Apart from the surveys discussed below, the only geophysics carried out over Black Jacks since then has been a Dighem survey flown for CSR (Peters and Fraser, 1982). No anomalies were recorded.

The bedrock has been sampled at a station interval of 25m and contour plans of lead and zinc values produced. High assays were recorded for both elements (to more than 1%).

INTERPRETATION

DOWN-HOLE PEM

DDH DTBJ-84-2, Drilled to a depth of 98.5m, was logged to 93m with a PEM probe using a 100m square loop placed to the east of the hole (on the eastern side of the highway). This hole had no significant mineralised intersections and no EM responses were obtained (Figure 2).

VLF

Most of the grid has been covered by VLF at a 12.5m station

spacing. Both the NWC and Japan transmitting stations were used. The results have been presented as dip angle profiles (Figure 3) and as contours (Figure 4) using a modified 'Fraser' filter. Few well-defined anomalous zones were observed and the contouring shown in Figure 4 is largely tentative. An exception is the eastern contact between the limestone and the Moina sandstone in the northern half of the grid.

Some local VLF anomalies coincide with bedrock geochemical highs (eg, near the old workings). Perhaps the most interesting response is on lines 62100N and 62200N around 67370E and open to the north (out of the joint venture area).

CONCLUSIONS AND RECOMMENDATIONS

Although several costeans have been dug, particularly near the old Black Jack's workings, this grid has not been extensively explored. There has been little geophysical work and only two, relatively short, DDH's have been drilled.

Although there is some difficulty in interpreting the geochemistry*, there are several high-value geochem zones on the grid. The correspondence between the geochem and VLF suggests (?confirms) that the mineralisation occurs along fractures or planes of weakness. While it is perhaps likely that the geochem highs represent 'sweating out' of disseminated mineralisation within the carbonates, they may also be due to massive sulphides (at depth).

Ignoring the recommendations for experimental surveys over Oceana, it is suggested that the grid be covered by dipole-dipole IP. If this represents too large an area, then at least the geochem highs should be covered. High-accuracy magnetics should also be carried out. A gravity survey, more detailed than those carried out elsewhere in the region, and with the data thoroughly processed (see Summary), should also define potentially economic sized deposits.

MARIPOSA

EXPLORATION HISTORY

Unlike Black Jacks, there has been a considerable amount of exploration over the Mariposa prospect. A list of the geophysical surveys is given in Table 3. In 1950 the BMR outlined the mineralisation using gravity. Following a (geophysical) gap of twenty one years, a gradient array IP survey also defined

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* Drilling beneath bedrock geochem anomalies elsewhere in the area has suggested that the anomalies are due to near-surface concentrating processes; see report by L. Wall, in Kary (1985).

anomalies over the area of known sulphides (about 1 million tonnes at 4% combined Pb & Zn and 45g/t Ag).

Amoco have tried several techniques on this grid. A fixed-loop EM survey (using an EM37) was carried out over seven lines in 1982 (Kary and Jones, 1983). Responses were obtained in the vicinity of the (western) loop edge on most lines. The strongest responses, which occurred on lines 59300N and 59400N, were interpreted at the time as being due to a poor, but prospective, conductor (Staples, 1983). Subsequent experience with the EM37 system by Geoterrex has shown that these responses are due to 'loop edge' effects. There are no prospective anomalies from that survey.

The gradient array IP survey carried out for McIntyre Mines in 1971 successfully defined the mineralised zone (plus a graphitic sequence to the south-west). Geologic noise levels were apparently low (judging from the plan of selected contours in Bishop, 1983). This survey only extended as far north as 59300N and only covered the western side of the grid.

Two lines (59200N & 59400N) were surveyed with dipole-dipole IP in January 1984. The results were interpreted by Collins (1984) who noted that a resistivity low at 59200N/67300E may be related to the "EM37 anomaly at 67250E". On this criterion, together with a geochemical association, Collins suggested further work. Given the re-interpretation of the EM survey (described above), and the fact that there is no associated chargeability response, I suggest that a drill target has not been defined. Despite the high chargeability of the limestone, the apparent success of the gradient array survey suggests that further dipole-dipole IP surveys (which give better depth penetration and depth definition) may be warranted.

Amoco surveyed the Mariposa grid with gravity using a 50m station spacing. In comparison to the BMR's anomaly, only a subtle inflexion was recorded over the workings (at the edge of a broad high to the east which corresponds with a thinnning of the overburden). A more detailed survey is required to properly define the known mineralisation and outline any other deposits.

As with Black Jacks, sampling of the bedrock has revealed areas of highly anomalous lead and zinc values.

INTERPRETATION

DOWN-HOLE PEM

In February 1985, Crone Geophysics carried out down-hole PEM surveys on the Mariposa Grid. The holes logged were nos 1, 2, 4, 6, 7 & 9 (Figures 5, 6, 7, 8, 9 & 10). One large loop (approx. 450m x 200m) was used to energise the ground for all holes except no. 7 which had a 100m square loop placed immediately to the west of the collar.

Although all holes were cased with plastic piping, some holes were blocked well above the drilled depth. The table below shows the logged and total depths.

Hole	Logged Depth	Drilled Depth
DTM-84-1.	115m	124.6m
DTM-84-2.	179m	186m
DTM-84-4.	76m	77.3m
DTM-84-6.	115m	238m
DTM-84-7.	64m	65.5m
DTM-84-9.	125m	200m.

DDH 9 was the only hole which recorded a significant response. The hole was resurveyed with 100m loops placed to the north, west and south of the hole (Figures 10b, 10c and 10d). A small, poor conductor was interpreted at a depth of 35m to 40m: lying below the hole and dipping to the west (ie, conformably down-dip of the hole) and lying possibly to the south of DDH 9. The response is not large enough to constitute a drill target.

VLF

A VLF survey was carried out over the grid (north of 58600N) in 1984. A station spacing of 12.5m was used and only NWC was read. The results have been presented as dip angle profiles (Figure 11) and as contours using a modified 'Fraser' filter (Figure 12). The strongest responses were over the old Mariposa workings; the weakly mineralised eastern fault zone was also defined.

CONCLUSIONS AND RECOMMENDATIONS

The VLF and gradient array IP data have both successfully defined the known zones of mineralisation: in as much as the strongest sections of the zones have been drilled, no untested areas remain, however both methods have only tested the near-surface.

The results of the various TEM surveys tried over Oceana indicate that the sort of sulphides likely to occur in this area would probably not be sufficiently conductive to respond. Therefore the lack of an anomaly from the EM37 survey probably does not mean that the area has been sufficiently explored. Although the dipole-dipole IP survey showed that the limestones were chargeable in comparison with the enclosing sandstones, a large dipole survey (covering a much larger subsurface area than the 100m dipole survey on line 59400N) might be an effective way of searching for a deeper target.

It is recommended that Amoco's gravity data be re-processed (including the removal of the effect of the variation in depth to

bedrock). Any gravity response correlating with (for example) an IP anomaly would considerably upgrade that target. For the same reason (plus its apparent success at Oceana), a high-accuracy magnetic survey should also be completed. (Such surveys have been planned by Amoco, but have not happened because of equipment failure.)

BANNOCKBURN & SUNNY CORNER

EXPLORATION HISTORY

Part of this grid was superficially examined by Rio Tinto in 1959 (Boniwell, 1959). It was later (1971) flown over with an EM system (HEM701) but no responses were recorded. Table 3 lists no other geophysical surveys prior to Amoco's exploration program.

INTERPRETATION

SURFACE PEM

A three-component, fixed-loop PEM survey was carried out over the Sunny Corner area (in the north-west corner of the Bannockburn grid) in February, 1985. A domal structure had been interpreted and an in-loop survey was designed to detect any shallowly dipping conductors. The channel 1 results for each component have been contoured (Figures 13, 14 & 15). The responses have been interpreted as being due to a conductive host or overburden and not a discrete conductor.

DOWN-HOLE PEM

Four holes were logged with down-hole PEM. For holes 2 and 4, the large loop (500m x 450m) laid out for the surface survey was used. 100m and 135m square loops were used for holes 3 and 5a respectively. The responses were flat, except for that from hole 3, which is interpreted as a conductive surface effect (see Figures 16, 17, 18 & 19).

VLF

A VLF survey was carried out over most of the Bannockburn grid (including the Sunny Corner area) in June, 1984. The transmitting stations at both NWC and Japan were read (at a 12.5m station interval). The results have been presented as dip angle profiles (Figure 20) and as contours using a modified 'Fraser' filter (Figure 21).

The Japanese transmitter (JPN) was almost at the ideal direction of parallel to strike and better results were obtained with this transmitter than for NWC. However there were no high amplitude anomalies recorded. Responses were obtained over known mineralisation at the Bannockburn workings and the limestone's eastern and western contacts were mostly followed. Since these contacts are often inferred rather than mapped, it is possible that the VLF defines the true position.

CONCLUSIONS AND RECOMMENDATIONS

One DDH has been drilled beneath the old Bannockburn workings, but the rest of the drilling has been at Sunny Corner. Given that the bedrock geochemistry is probably only reflecting near-surface processes, a dipole-dipole IP survey is recommended over the grid to test the area at depth. Because of their apparent success at Oceana, magnetic and gravity surveys are also recommended.

OTHER AREAS WITHIN THE E.L.

Limestones at the southern end of the joint venture area have been regionally covered by the following grids: Professor Range, Amber Creek, Laurel and King Billy. However there has been little work done in this region: Amoco has not carried out any geophysical surveys over these grids. Bishop (1983) noted that a Turair survey flown in 1973 recorded two anomalies over the prospective area. These were followed up (by Geophoto Resources; Johnston, 1974) by testing the apparent location (ie, there was no confirmation of the responses by ground EM) with deep augering for geochemical assays. No significant values were obtained.

SUMMARY

Geophysical surveys at Oceana and at Mariposa have indicated that the target mineralisation is dense but poorly conducting and lies within a chargeable host. It may give a subtle magnetic response.

Despite the expected poor contrast expected for the IP effect, any massive sulphide deposit should have a much lower resisitivity than the country rock and dipole-dipole IP surveys are recommended. Experimentation with geophysical techniques not routinely used in base metal exploration is suggested. In particular, the use of current gathering into the target should be exploited: magnetometric resistivity and grounded-loop EM methods are suggested.

Gravity surveys have been conducted over Mariposa and other areas of limestone held by Amoco. Good (ie, smooth) data was generally acquired and I suggest that further processing, including removal of terrain and, especially, the variation in depth to bedrock, would prove most useful. Sinkholes, facies changes, etc are likely to cause unwanted responses and a more detailed station spacing than the 50m used so far, is required.

High accuracy magnetic surveys have been recommended over all of the grids since it supposedly worked at Oceana. Before undertaking such surveys, it would be worthwhile to determine the cause of the response at Oceana (magnitude unknown). This would require sampling of material above the deposit as well as the sulphides themselves.

It could be argued that the potential for an economic sized base metal deposit at Mariposa is not high: the area was previously drilled by Zeehan Explorations and MacIntyre Mines and Amoco have drilled another nine holes. Similarly at Bannockburn, although much less geophysics has been carried out, the geologically most favourable area, Sunny Corner, has had several holes drilled with little encouragement. However, if the exploration techniques used have not been effective, then large areas of both grids still have potential.

On both criteria, the prospectivity of the Black Jacks grid would appear to be much higher (although the geochemistry is not as anomalous as it is at Mariposa). Only two holes have been drilled and there is a large area which has not been investigated at depth. The other areas of limestone within the E.L. have apparently received little attention.

J.R. Bishop
July, 1985.

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TABLE 1

Chronological Listing of Geophysical Surveys over the Oceana Deposit

OPERATOR:	METHOD	DATE	COMMENT	REFERENCE
BMR:	Gravity	1947	Anomalies over mineralisation	Langron, 1966.
" :	Magnetics	"	Possible correlation with mineralisation	"
" :	SP	"	Response in the noise level	"
" :	Equipotential	"	Weak indications	"
" :	Potential Ratio	"	" "	"
" :	EM	"	No anomalies over mineralisation	"
Scintrex:	HEM-701	1971	No anomalies	Gedde, 1972.
Surveys for Amoco				
Scintrex:	Gradient IP	1978	Resistivity and chargeability responses over mineralisation	Jones, 1979.
" :	Magnetics	"	High surface noise levels from iron debris	"
Amoco:	Moving loop PEM	1979	No responses	"
Scintrex:	Dipole-dipole IP	1980	Depth limited responses over mineralisation	Roxburgh & Jones, 1980.
Dighem:	Dighem	"	Superficial responses over mineralisation	Jones, 1981.
Geoterrex:	Fixed loop PEM	"	No responses over mineralisation	Roxburgh & Jones, 1980.
" :	Petrophysics	"	Massive sulphide core samples dense & conductive, but not anomalously chargeable.	Jones, 1981.
Wongela:	Gravity	1980/81	No (good) correlation over known mineralisation	"
?:	Down-hole PEM	"	Small anomalies consistent with intersected mineralisation	" (comments only).
Geoterrex:	EM37	1982	Loop edge effects over mineralisation	Jones, 1983.
Geoex:	Down-hole Sirotem	"	Minor responses	Jones, 1982a.
Mitre:	Down-hole density and gamma logging	1982	Not interpreted	"

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OPERATOR:	METHOD	DATE	COMMENT	REFERENCE
Geoex:	Down-hole Sirotem	1983	No anomalies of interest	Jones, 1983.
" :	Down-hole density and gamma logging	1983	Not interpreted	"
Mitre:	"	"	" "	"
Zonge:	CSAMT	1985	Possible correlation with mineralisation using small dipole spacing	Results being processed.

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TABLE 2

Oceana Petrophysical Measurements

SAMPLE NO.	DEPTH (m)	DENSITY (t/c.m.)	RESISTIVITY (ohm-m)	CHARGEABILITY (millisecs)	PETROLOGY
DDH 2					
1.	98	-	500	10	Claystone with 10.6% Pb.
2.	-	-	-	-	Disintegrated massive Pb/Zn.
3.	146	3.0	480	26	Ankeritic dolomite.
DDH 4					
4.	57	2.6	800	47	Limestone breccia.
5.	69	2.7	1200	34	Silty dolomite.
6.	158	2.5	3500	0	Shale/sandstone.
7.	255	3.3	2	10	Semi-massive siderite/galena sphalerite (11.9% Pb & 3.7%Zn)
8.	307	5.0	0.2	0-10	Mineralised breccia (36.4% Pb & 5.3% Zn)

Measurements by Geoterrex, 1980.

All samples had negligible magnetic susceptibility.

115231

TABLE 3

A List of Geophysical Surveys Carried Out over the Dundas Grids

OPERATOR:	METHOD	DATE	COMMENT	REFERENCE
BLACK JACKS				
Scintrex:	HEM701	1971	Several weak anomalies	Gedde, 1972.
" :	Turam	1972	Several shallow, weak anomalies	Howland-Rose, 1972.
Tenneco:	SP	"	Anomalies may be due to topography	Besley (1972) or Rugg (1972).
Shirley:	Gravity	"	Inconclusive	Shirley, 1972.
Dighem:	Dighem	1982	No responses	Peters and Fraser, 1982.
Surveys for Amoco				
Amoco:	VLF	1984	Weak responses correlate with geol. & some geochem.	This report.
Mitre:	Down-hole density and gamma logging	"	DDH 2: not interpreted	Kary, 1985.
Crone:	Down-hole PEM	1985	DDH 2: no response	This report.
MARIPOSA				
BMR:	Gravity	1950	Anomaly (?)coincident with mineralisation	Loh, 1950.
" :	Magnetics	"	Inconclusive (survey affected by iron debris)	" "
CGG:	Gradient IP	1971	Chargeability anomaly over mineralisation	Omnes, 1971.
" :	SP	"	Not diagnostic	" "
Scintrex:	HEM701	"	No anomalies	Gedde, 1972.
" :	Turair	1973	" "	Howland-Rose, 1973.
Surveys for Amoco				
Geoterrex:	EM37	1982	Loop edge effects only	Kary and Jones, 1983.
Mewkill:	Gravity	"	Closer stn spacing needed & further processing	Jones, 1982b.
Scintrex:	Dipole-dipole IP	1984	Further surveys may be warranted	Collins, 1984.

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OPERATOR: METHOD	DATE	COMMENT	REFERENCE
MARIPOSA (cont.)			
Amoco: VLF	1984	Good correlation with geol. & geochem.	This report.
Mitre: Down-hole density and gamma logging	"	Not interpreted	Kary, 1985.
Crone: Down-hole PEM	1985	One small response in DDH 9	This report.
BANNOCKBURN & SUNNY CORNER			
Rio Tinto: Gravity	1959	Inconclusive	Boniwell, 1959.
" " " : Magnetics	"	Results not sighted	"
" " : EM	"	Inconclusive	" "
Scintrex: HEM701	1971	Some weak anomalies adjacent to grid	Gedde, 1972.
Geoterrex: Input	1978	Regional: 1 line over Mariposa -no responses	MacNamara, 1981.
Surveys for Amoco			
Amoco: VLF	1984	Weak responses partially correlate with geol. & geochem.	This report
Mitre: Down-hole density and gamma logging	"	Not interpreted	Kary, 1985.
Crone: Surface PEM	1985	Responses due to conductive overburden or host rock only	This report
" : Down-hole PEM	"	No responses	" "

APPENDIX

Sunny Corner Surface FEM Data

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CRONE GEOPHYSICS Limited
SURFACE PEM

Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L65300E	9

Time base: 10ms ZTS: 140 Date: 19/02/85
Ramp time: 0.5ms Gain: 200

STATION	COMPONENT	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8
7750N	Z	127.2	82.0	41.6	19.7	7.3	1.6	0.0	-0.3
	X	106.6	40.2	10.4	1.6	-0.7	-0.5	0.6	1.0
	Y	66.6	23.2	3.6	-1.0	-1.7	-0.8	-0.4	-0.2
7775N	Z	151.8	90.5	43.5	19.6	6.8	1.1	-0.4	-0.7
	X	139.2	48.4	11.5	1.0	-1.7	-1.4	-0.8	-0.4
	Y	81.3	26.3	3.5	-1.1	-1.6	-0.8	-1.1	0.3
7800N	Z	198.1	103.7	46.5	20.2	6.6	0.9	-0.4	-0.6
	X	146.5	49.4	11.7	1.2	-1.4	-1.0	-0.5	-0.4
	Y	82.8	23.3	2.1	-2.0	-2.2	-1.5	-1.2	-1.2
7825N	Z	225.8	110.9	47.9	20.5	6.6	1.1	-0.3	-0.4
	X	133.1	46.0	11.1	1.2	-1.3	-1.1	-0.1	-0.2
	Y	108.8	31.0	2.8	-2.5	-3.0	-2.4	-2.3	-3.4
7850N	Z	252.4	118.0	49.3	20.6	6.3	1.0	-0.2	-0.4
	X	112.3	41.1	9.9	0.9	-1.3	-0.9	-0.1	0.0
	Y	126.9	35.7	3.8	-2.3	-2.6	-1.4	-0.4	-0.1
7875N	Z	267.1	120.7	50.3	20.5	6.3	0.9	-0.1	-0.5
	X	98.3	37.4	9.2	1.0	-1.2	-0.7	-0.1	0.0
	Y	126.1	35.7	3.7	-2.9	-2.6	-1.3	-0.6	-0.3
7900N	Z	310.0	133.5	52.0	20.4	5.5	0.4	-0.7	-0.6
	X	94.0	36.9	9.5	1.5	-0.5	0.0	0.7	0.5
	Y	118.1	28.9	0.9	-3.7	-2.9	-1.4	-0.8	-0.3
7925N	Z	313.0	135.0	52.8	20.9	6.0	0.6	-0.6	-0.6
	X	63.3	28.8	7.3	0.5	-0.9	-0.5	0.3	0.2
	Y	128.7	34.1	2.1	-3.4	-2.9	-1.2	-0.8	-0.1
7950N	Z	347.2	144.7	54.6	20.4	5.0	-0.3	-1.0	-0.7
	X	11.9	16.3	5.5	1.2	0.2	0.2	0.5	0.4
	Y	130.2	34.4	1.8	-3.9	-3.3	-1.5	-0.8	-0.5
7975N	Z	333.2	142.8	54.8	20.8	5.6	0.3	-0.5	-0.5
	X	12.9	16.5	4.8	0.5	-0.7	-0.4	0.1	-0.1
	Y	109.4	29.8	0.8	-3.9	-2.8	-1.3	-1.1	-0.9
8000N	Z	302.0	136.1	53.6	20.6	5.8	0.5	-0.5	-0.6
	X	-13.1	6.9	2.7	0.7	0.0	0.0	0.1	0.0
	Y	91.3	26.4	0.2	-4.2	-2.9	-1.4	-0.8	-0.2
8025N	Z	320.6	144.0	56.0	21.2	5.8	0.2	-0.6	-0.7
	X	-34.2	4.0	2.2	0.4	0.2	0.3	0.5	0.1
	Y	117.0	30.9	0.8	-3.9	-2.4	-0.8	-0.6	0.3
8050N	Z	308.5	144.6	56.9	21.3	5.8	0.1	-0.5	-0.7
	X	-39.7	2.2	0.7	-0.6	-0.4	-0.3	0.1	-0.1
	Y	119.7	30.1	0.3	-4.2	-2.6	-0.8	-0.8	-0.1

CRONE GEOPHYSICS Limited

SURFACE PEM

Client
AMOCO

Grid
SUNCORNER

Line
L6S400E

Tx Loop
9

Time base: 10ms
Ramp time: 0.5ms

ZTS: 140
Gain: 200

Date: 19/02/85

STATION	COMPONENT	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8
7750N	Z	196.3	100.1	46.5	21.1	7.5	1.8	0.0	0.0
	X	137.9	45.1	10.1	0.7	-1.7	-1.1	-0.7	-0.1
	Y	58.3	19.0	1.5	-2.4	-2.6	-1.2	-0.5	0.1
7775N	Z	217.7	105.4	47.1	20.9	7.0	1.6	-0.3	-0.4
	X	159.7	50.5	10.7	0.6	-1.9	-1.0	-0.9	-0.3
	Y	54.6	17.6	0.9	-2.7	-2.5	-1.1	-0.2	0.0
7800N	Z	291.2	121.9	49.3	20.2	5.9	0.6	-0.6	-0.6
	X	200.9	59.5	11.6	0.2	-2.5	-1.6	-1.0	-0.4
	Y	89.5	27.3	2.2	-3.1	-3.0	-1.3	-0.8	-0.4
7825N	Z	355.5	137.5	52.1	20.6	5.7	0.6	-1.0	-0.5
	X	182.5	55.3	10.8	-0.1	-2.5	-1.6	-1.2	-0.8
	Y	78.1	24.2	0.9	-3.6	-3.1	-1.5	-0.5	-0.1
7850N	Z	378.5	144.0	52.9	20.3	5.6	0.3	-0.6	-0.5
	X	144.2	47.4	9.8	0.1	-2.0	-1.3	-0.4	-0.2
	Y	63.0	20.8	-0.1	-3.6	-3.0	-1.1	-0.5	-0.2
7875N	Z	409.1	151.5	54.4	20.1	5.1	-0.1	-0.9	-0.8
	X	118.4	42.1	8.6	-0.4	-2.2	-1.3	-0.3	-0.2
	Y	43.7	14.8	-1.5	-4.2	-2.9	-1.3	-0.4	-0.5
7900N	Z	427.8	158.4	55.5	19.7	4.6	-0.2	-0.9	-0.7
	X	77.3	33.2	7.0	-0.6	-1.9	-1.0	-0.2	-0.1
	Y	30.1	11.2	-2.8	-4.6	-3.1	-1.0	-0.1	0.2
7925N	Z	425.4	158.9	54.9	19.2	4.2	-0.5	-1.0	-0.6
	X	37.7	22.8	5.0	-0.4	-1.4	-0.7	0.0	-0.2
	Y	20.8	9.9	-3.1	-4.6	-2.9	-0.8	0.0	-0.1
7950N	Z	414.8	158.7	55.5	19.3	4.6	-0.3	-0.7	-0.6
	X	13.3	18.0	3.8	-1.1	-1.6	-0.9	-0.2	0.2
	Y	10.5	4.6	-4.5	-4.3	-2.4	-0.4	0.3	0.3
7975N	Z	405.4	159.9	56.5	19.7	4.6	-0.5	-0.8	-0.9
	X	-17.8	10.8	2.6	-0.6	-0.7	0.0	0.3	0.1
	Y	4.5	0.9	-6.0	-5.2	-2.6	-0.8	-0.1	0.0
8000N	Z	397.4	160.8	57.4	20.1	4.9	-0.1	-0.7	-0.5
	X	-37.7	5.3	1.2	-0.6	-0.5	0.2	0.5	0.4
	Y	6.6	2.5	-5.3	-5.0	-2.6	-0.9	0.1	-0.1
8025N	Z	362.0	154.1	56.0	19.6	4.8	-0.1	-0.5	-0.5
	X	-56.4	-2.7	-0.8	-1.3	-0.9	-0.5	-0.2	-0.2
	Y	-10.6	-0.8	-6.5	-5.4	-2.8	-1.0	-0.2	-0.5
8050N	Z	328.3	147.5	56.0	20.4	5.5	0.7	-0.1	-0.6
	X	-69.1	-7.8	-1.7	-1.0	-0.2	0.0	0.4	0.0
	Y	-14.2	-1.1	-6.0	-5.4	-2.7	-0.9	0.2	0.0

CRONE GEOPHYSICS Limited
SURFACE PEM

Client
AMOCO

Grid
SUNCORNER

Line
L65S00E

Tx Loop
9

Time base: 10ms
Ramp time: 0.5ms

ZTS: 140
Gain: 200

Date: 19/02/85

STATION	COMPONENT	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8
7750N	Z	218.5	109.4	46.5	19.3	6.7	1.3	0.2	-0.3
	X	139.8	44.6	8.8	-0.2	-1.0	-0.7	-0.3	-0.1
	Y	44.3	16.4	-1.0	-4.5	-2.8	-1.4	-0.6	-0.4
775N	Z	262.2	119.9	48.4	19.5	6.5	1.2	0.2	-0.4
	X	156.5	49.0	8.2	-1.4	-2.2	-1.3	-0.4	0.0
	Y	-8.8	0.8	-4.6	-4.6	-2.2	-0.8	0.3	0.3
7800N	Z	307.6	131.2	49.8	18.9	5.7	0.8	-0.1	-0.4
	X	147.6	47.1	9.1	0.0	-0.7	-0.2	0.6	0.3
	Y	-22.2	-1.5	-5.0	-4.7	-2.2	-0.8	0.2	0.2
782SN	Z	337.0	138.4	50.9	18.9	5.2	0.5	-0.5	-0.4
	X	139.9	46.2	8.3	-1.1	-2.2	-1.2	-0.4	0.1
	Y	-15.4	2.8	-3.7	-4.7	-2.5	-1.0	0.0	-0.4
7850N	Z	373.5	149.8	53.2	18.8	4.8	0.1	-0.3	-0.7
	X	111.4	40.7	7.1	-1.6	-2.4	-1.2	-0.2	-0.2
	Y	-70.4	-13.6	-6.7	-4.1	-1.3	-0.1	0.6	0.2
787SN	Z	379.6	152.0	54.0	18.9	4.9	0.1	-0.4	-0.5
	X	59.2	28.3	5.0	-1.2	-1.8	-0.8	0.1	-0.1
	Y	-45.8	-2.8	-4.4	-4.6	-2.2	-0.6	0.5	0.2
7900N	Z	373.6	153.3	54.5	19.0	5.0	0.3	-0.3	-0.5
	X	31.6	22.6	4.1	-1.3	-1.6	-0.7	0.0	0.2
	Y	-74.0	-14.4	-7.3	-4.5	-1.6	-0.1	0.6	0.4
792SN	Z	360.3	151.7	54.6	19.0	4.9	0.2	-0.3	-0.5
	X	5.6	13.9	2.8	-0.9	-0.8	-0.3	0.4	0.2
	Y	-70.8	-11.4	-6.5	-4.5	-1.7	0.0	0.9	0.7
7950N	Z	340.2	150.5	54.9	19.1	4.8	0.1	-0.4	-0.7
	X	-29.7	4.7	0.3	-1.3	-0.7	0.0	0.5	0.4
	Y	-71.2	-14.0	-7.2	-4.5	-1.5	-0.1	0.8	0.6
7975N	Z	322.4	147.8	54.8	19.3	5.1	0.3	-0.2	-0.4
	X	-35.5	3.0	0.5	-0.9	-0.5	-0.2	0.1	-0.4
	Y	-81.9	-17.6	-8.8	-5.1	-1.9	-0.5	0.4	0.0
8000N	Z	297.9	142.3	53.4	18.7	4.4	0.0	-0.7	-0.4
	X	-44.9	-2.1	-0.9	-1.1	-0.2	0.1	0.4	0.2
	Y	-72.4	-16.6	-8.4	-5.1	-2.0	-0.5	0.3	-0.2
802SN	Z	288.8	141.7	54.6	19.9	5.5	0.6	-0.2	-0.3
	X	-55.1	-6.7	-2.1	-1.1	0.0	0.3	0.7	0.2
	Y	-63.8	-16.7	-8.6	-5.1	-1.8	-0.4	0.5	0.4
8050N	Z	285.4	142.7	55.4	20.0	5.2	0.2	-0.7	-0.9
	X	-63.4	-11.3	-3.8	-1.8	-0.7	-0.1	0.1	0.0
	Y	-60.2	-17.7	-9.6	-5.5	-2.1	-0.4	0.3	0.1

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115237

CRONE GEOPHYSICS Limited
SURFACE PEM

Client
AMOCO

Grid	Line	Tx Loop
SUNCORNER	L6560ØE	9

Time base: 10ms
Ramp time: Ø.5ms

ZTS: 140
Gain: 200

Date: 19/02/85

STATION	COMPONENT	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8
7700N	Z	173.4	101.7	44.9	18.8	6.4	1.0	-0.2	-0.6
	X	122.5	42.9	8.8	0.1	-1.1	-0.8	-0.4	0.0
	Y	-62.2	-21.0	-10.2	-5.4	-1.6	-0.3	-0.5	0.3
7725N	Z	200.9	109.3	46.6	19.0	6.3	1.1	0.1	-0.6
	X	116.2	40.8	7.4	-1.1	-1.5	-1.0	-0.3	-0.4
	Y	-58.0	-17.7	-9.5	-5.5	-1.9	-0.5	-0.7	0.1
7750N	Z	229.0	118.7	49.2	20.0	6.9	1.8	0.6	0.0
	X	121.5	42.7	8.4	-0.5	-0.8	-0.2	0.7	0.0
	Y	-74.0	-21.0	-10.0	-5.3	-1.5	0.0	-0.2	0.1
7775N	Z	264.5	128.7	50.2	19.0	5.7	0.7	-0.2	-0.2
	X	109.5	39.4	6.9	-1.3	-1.4	-0.5	0.5	0.3
	Y	-77.1	-19.7	-9.5	-5.6	-1.8	-0.3	0.5	0.0
7800N	Z	275.7	132.4	50.5	18.2	4.9	0.1	-0.6	-0.7
	X	107.9	39.6	7.3	-1.4	-1.8	-1.2	0.2	-0.2
	Y	-55.2	-10.8	-7.2	-5.3	-1.9	-0.5	0.4	0.1
7825N	Z	297.9	139.6	53.1	19.5	5.9	0.9	0.1	-0.2
	X	76.7	31.5	5.5	-1.4	-1.9	-1.2	0.0	-0.1
	Y	-108.2	-29.0	-11.2	-4.9	-1.0	0.2	0.6	0.1
7850N	Z	285.1	136.2	52.3	18.7	5.0	0.4	-0.1	-0.5
	X	36.5	20.0	2.1	-2.9	-2.5	-1.3	-0.2	-0.1
	Y	-97.5	-26.2	-10.7	-5.0	-1.1	0.1	0.7	0.2
7875N	Z	280.7	136.7	51.8	17.9	4.3	-0.5	-0.8	-0.8
	X	30.6	18.5	3.0	-1.7	-1.2	-0.6	0.5	0.2
	Y	-94.1	-25.6	-10.9	-5.4	-1.5	0.0	0.7	0.2
7900N	Z	260.5	132.8	51.8	18.6	5.3	0.7	0.1	-0.3
	X	10.3	11.4	0.9	-2.5	-1.6	-1.0	0.1	-0.1
	Y	-87.7	-27.2	-12.0	-6.0	-1.9	-0.3	0.5	0.1
7925N	Z	252.0	130.7	51.1	18.4	5.2	0.5	0.0	-0.2
	X	1.6	8.1	0.6	-1.8	-0.9	-0.5	0.2	0.0
	Y	-85.2	-26.1	-11.4	-5.8	-1.5	-0.1	0.5	0.0
7950N	Z	229.5	123.2	49.5	18.1	5.3	0.6	0.0	-0.3
	X	-16.7	-0.6	-2.2	-2.2	-0.7	0.1	0.8	0.1
	Y	-72.9	-25.2	-11.6	-5.9	-1.6	-0.1	0.8	0.3

CRONE GEOPHYSICS LIMITED

SURFACE PEM

115238

Client
AMOCO

Grid
SUNCORNER

Line
LS7900N

Tx Loop
9

Time base: 10ms
Ramp time: 0.5ms

ZTS: 140
Gain: 200

Date: 19/02/85

STATION	COMPONENT	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8
5225E	Z	136.3	93.5	43.1	17.6	4.5	-1.0	-2.0	-1.9
	X	56.4	27.9	8.1	1.6	0.0	-0.4	0.2	-0.4
	Y	157.0	48.8	8.5	-0.7	-1.7	-0.8	-0.3	0.0
5250E	Z	211.7	110.9	48.1	20.3	6.4	0.9	-0.4	-0.5
	X	67.3	30.2	8.1	1.1	-0.7	-0.2	0.3	0.0
	Y	135.5	40.3	5.4	-1.9	-1.9	-0.9	-0.7	0.1
5275E	Z	232.4	113.8	48.4	19.9	6.3	1.0	-0.1	-0.5
	X	59.6	27.7	7.1	0.5	-0.9	-0.7	0.1	-0.1
	Y	108.2	33.1	2.9	-3.2	-2.8	-1.6	-1.6	-0.7
5300E	Z	310.0	133.5	52.0	20.4	5.5	0.4	-0.7	-0.6
	X	94.0	36.9	9.5	1.5	-0.5	0.0	0.7	0.5
	Y	118.1	28.9	0.9	-3.7	-2.9	-1.4	-0.8	-0.3
5325E	Z	284.7	124.0	50.2	20.0	6.2	0.8	0.2	-0.4
	X	62.7	28.2	7.4	0.9	-0.6	-0.4	0.2	0.1
	Y	98.8	29.4	2.1	-3.3	-2.2	-0.8	-0.3	0.1
5350E	Z	377.0	145.7	53.6	19.5	5.2	0.1	-0.7	-0.7
	X	84.9	35.0	8.4	0.7	-1.0	-0.3	0.6	0.4
	Y	98.2	26.7	0.3	-4.1	-2.7	-1.1	-0.1	0.0
5375E	Z	409.8	153.2	54.7	19.9	5.1	0.0	-0.5	-0.6
	X	88.6	36.8	8.2	0.1	-1.4	-0.8	0.1	0.1
	Y	78.3	24.2	0.1	-4.3	-2.7	-1.0	0.1	0.0
5400E	Z	427.8	158.4	55.5	19.7	4.6	-0.2	-0.9	-0.7
	X	77.3	33.2	7.0	-0.6	-1.9	-1.0	-0.2	-0.1
	Y	30.1	11.2	-2.8	-4.6	-3.1	-1.0	-0.1	0.2
5425E	Z	387.9	151.2	53.5	18.9	5.0	0.2	-0.3	-0.8
	X	58.1	27.7	5.7	-1.0	-1.3	-0.8	0.4	-0.1
	Y	6.2	7.1	-3.3	-4.7	-2.5	-1.0	0.2	-0.2
5450E	Z	365.9	148.5	52.6	18.4	4.5	0.1	-0.4	-0.6
	X	51.8	27.2	5.4	-1.1	-1.6	-0.7	0.2	0.0
	Y	-20.6	0.9	-4.6	-4.8	-2.3	-0.7	0.3	0.1
5475E	Z	380.7	154.0	54.2	18.6	4.6	0.0	-0.4	-0.7
	X	49.8	25.2	5.4	-0.5	-1.0	-0.5	0.5	0.2
	Y	-43.0	-2.7	-4.9	-5.0	-2.2	-0.8	0.7	0.3
5500E	Z	373.6	153.3	54.5	19.0	5.0	0.3	-0.3	-0.5
	X	31.6	22.6	4.1	-1.3	-1.6	-0.7	0.0	0.2
	Y	-74.0	-14.4	-7.3	-4.5	-1.6	-0.1	0.6	0.4
5525E	Z	328.2	144.8	53.2	18.8	5.2	0.6	-0.1	-0.3
	X	22.1	18.3	3.5	-1.1	-1.2	-0.3	0.2	0.0
	Y	-72.8	-14.7	-7.8	-5.3	-2.2	-0.7	0.3	-0.1
5550E	Z	309.2	143.3	53.6	19.2	5.4	0.7	0.0	-0.3
	X	13.1	16.5	3.0	-1.3	-1.0	-0.3	0.4	0.1
	Y	-83.8	-19.3	-9.1	-5.3	-1.9	-0.7	0.2	-0.2
5575E	Z	268.9	132.6	51.3	18.7	5.7	0.9	0.3	-0.4
	X	5.9	11.1	0.9	-2.3	-1.6	-0.8	0.1	-0.1
	Y	-79.2	-22.6	-10.1	-5.6	-1.7	-0.4	0.5	0.0
5600E	Z	260.5	132.8	51.8	18.6	5.3	0.7	0.1	-0.3
	X	10.3	11.4	0.9	-2.5	-1.6	-1.0	0.1	-0.1
	Y	-87.7	-27.2	-12.0	-6.0	-1.9	-0.3	0.5	0.1

237

CRONE GEOPHYSICS Limited

115239

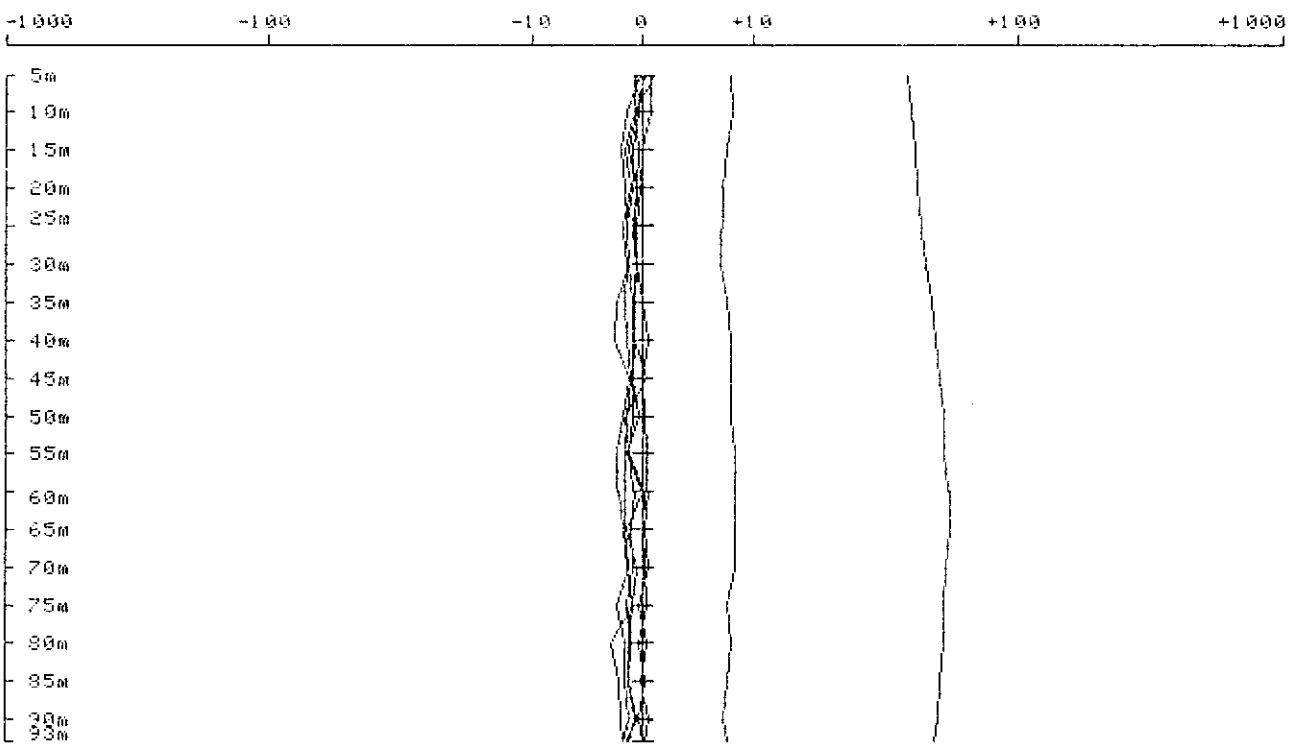
BOREHOLE PEM

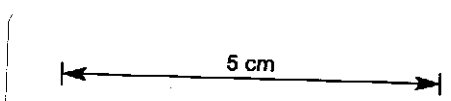
Client
AMOCO

Grid	Hole	Tx Loop
BLACKJACK	DTBJ84-2	1

Time base: 10ms	ZTS: 115	Date: 14/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:1000





BLACK JACKS GRID
DOWN-HOLE PEM

DTBJ-84-2

238

CRONE GEOPHYSICS Limited
BOREHOLE PEM

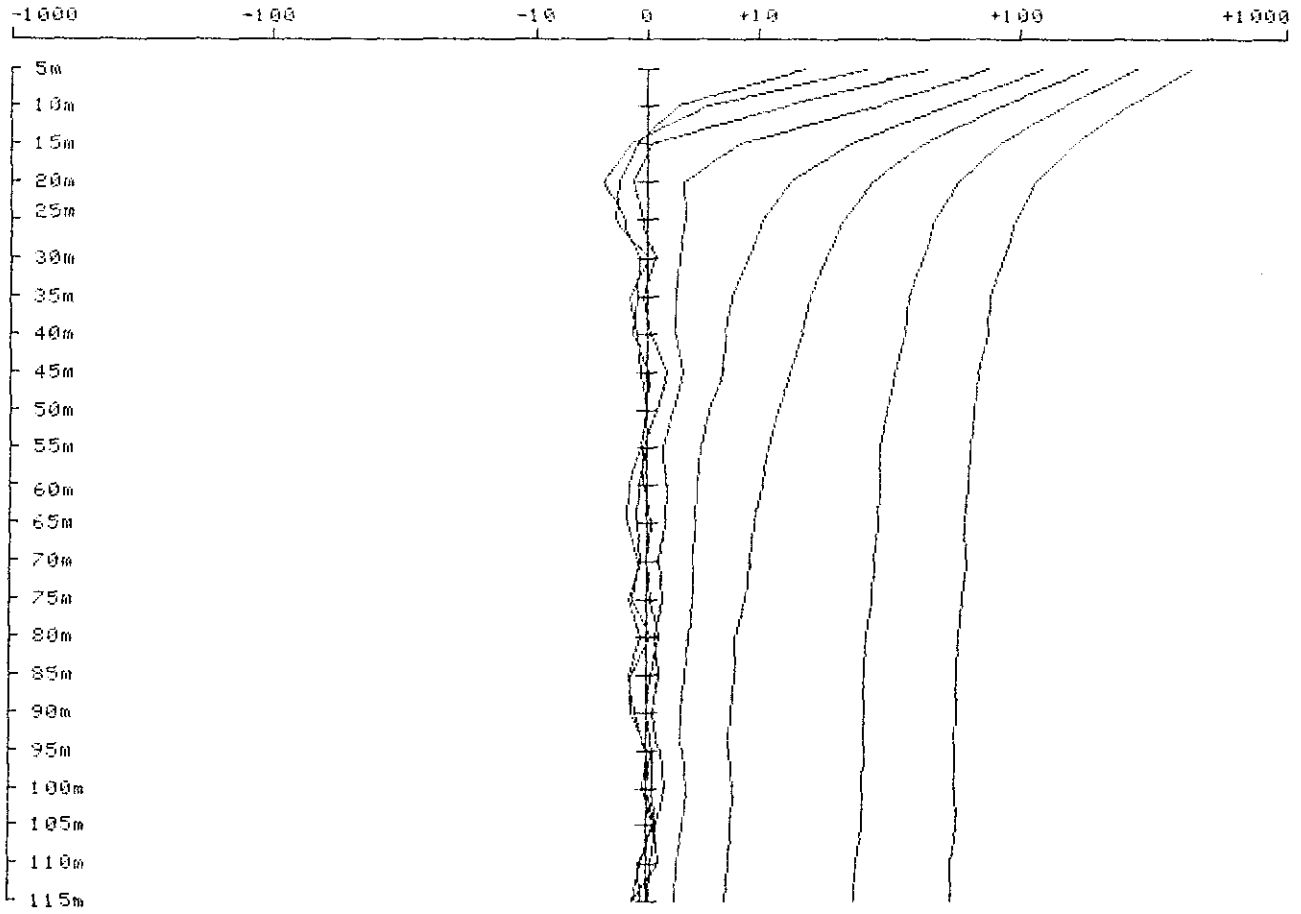
115240

Client
AMOCO

Grid	Hole	Tx Loop
MARIPOSA	DTM84-1	2

Time base: 10ms	ZTS: 125	Date: 14/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:1000



5 cm

MARIPOSA GRID
DOWN-HOLE PEM
DTM-84-1

239

CRONE GEOPHYSICS Limited
BOREHOLE PEM

115241

Client
AMOCO

Grid
MARIPOSA

Hole
DTM84-2

Tx Loop
2

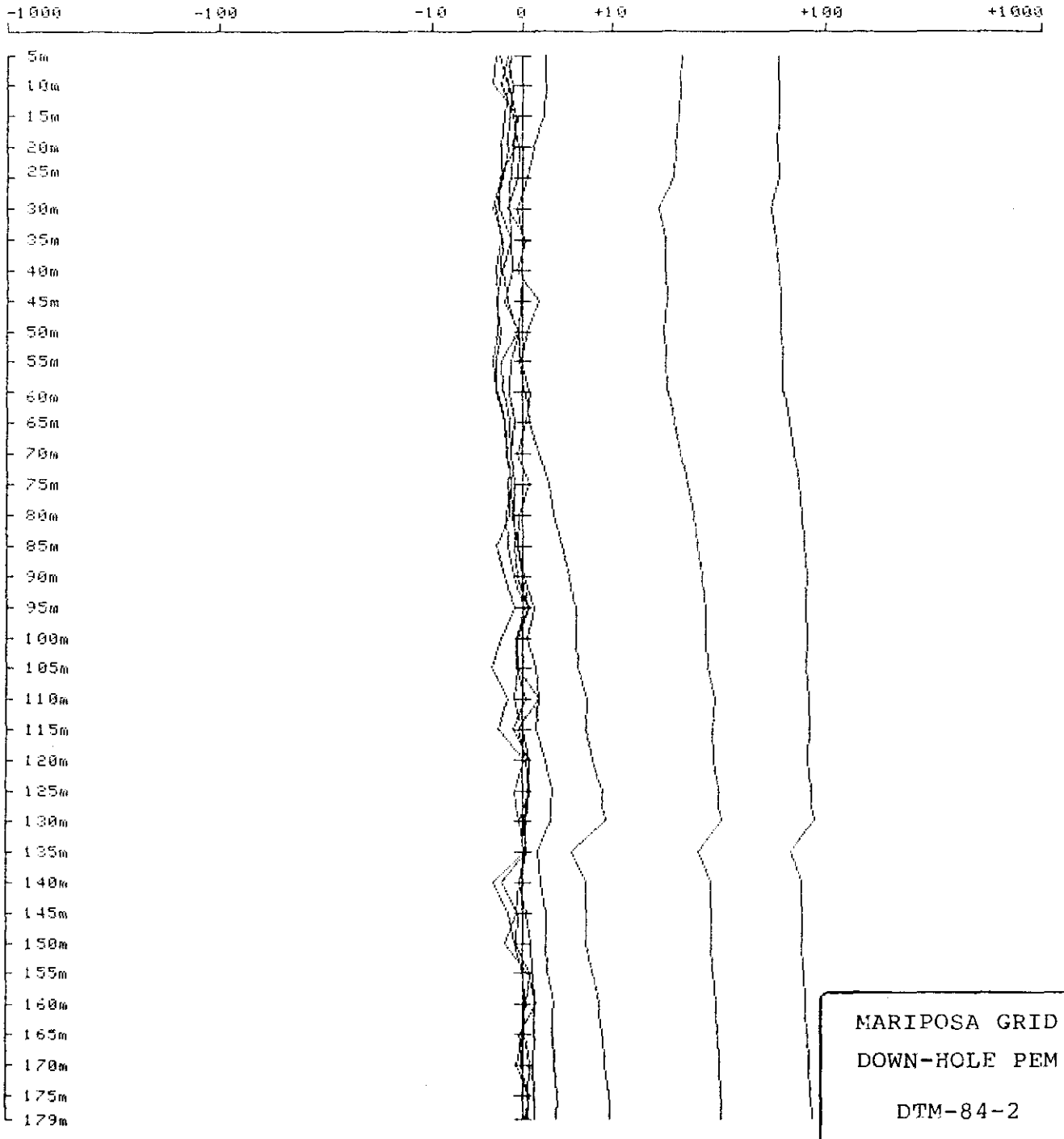
Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 14/02/85

Scale: 1:1000

5 cm



MARIPOSA GRID
DOWN-HOLE PEM

DTM-84-2

AM/MG85/09

FIG. 6

240

CRONE GEOPHYSICS Limited

115242

BOREHOLE PEM

Client
amco

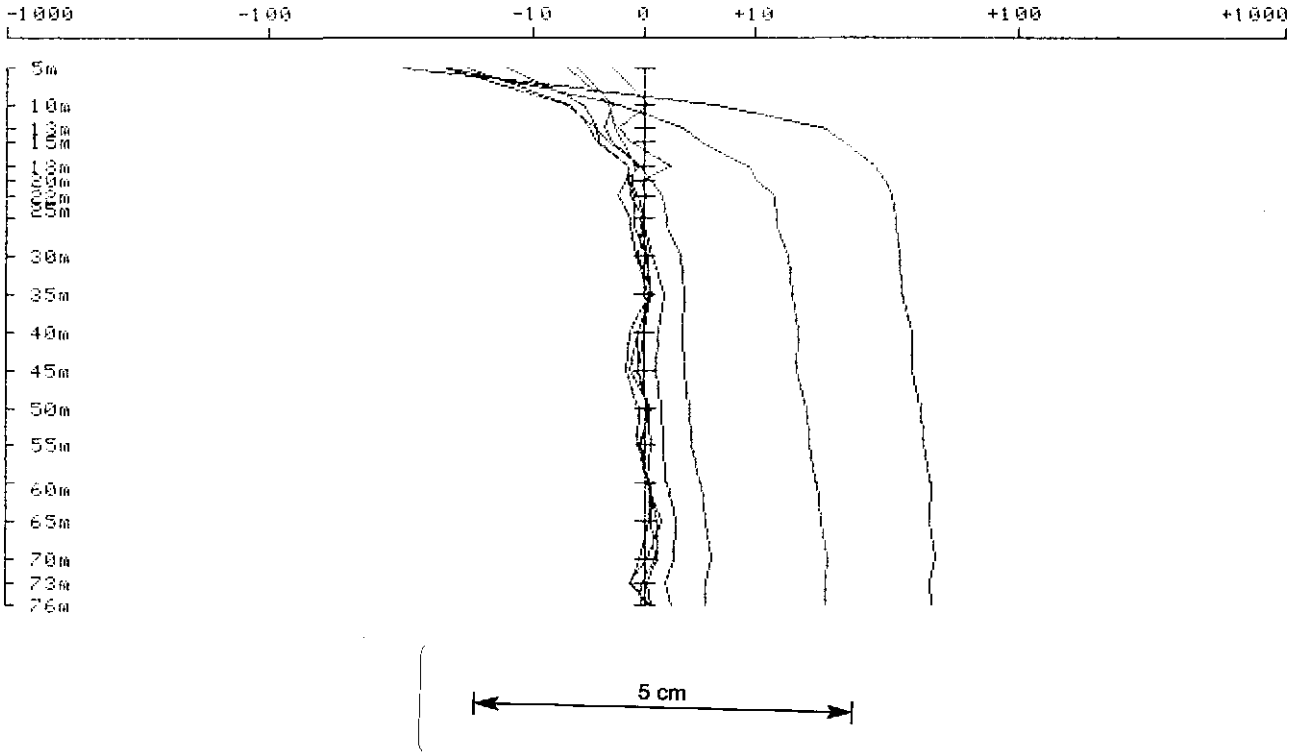
Grid	Hole	Tx Loop
MARIPOSA	HM844	2

Time base: 10ms
Ramp time: 0.5ms

ZTS: 131
Gain: 200

Date: 15/02/85

Scale: 1:1000



MARIPOSA GRID
DOWN-HOLE PEM
DTM-84-4

AM/MG85/09 FIG. 7.

241

CRONE GEOPHYSICS Limited

BOREHOLE PEM

115243

Client
amco

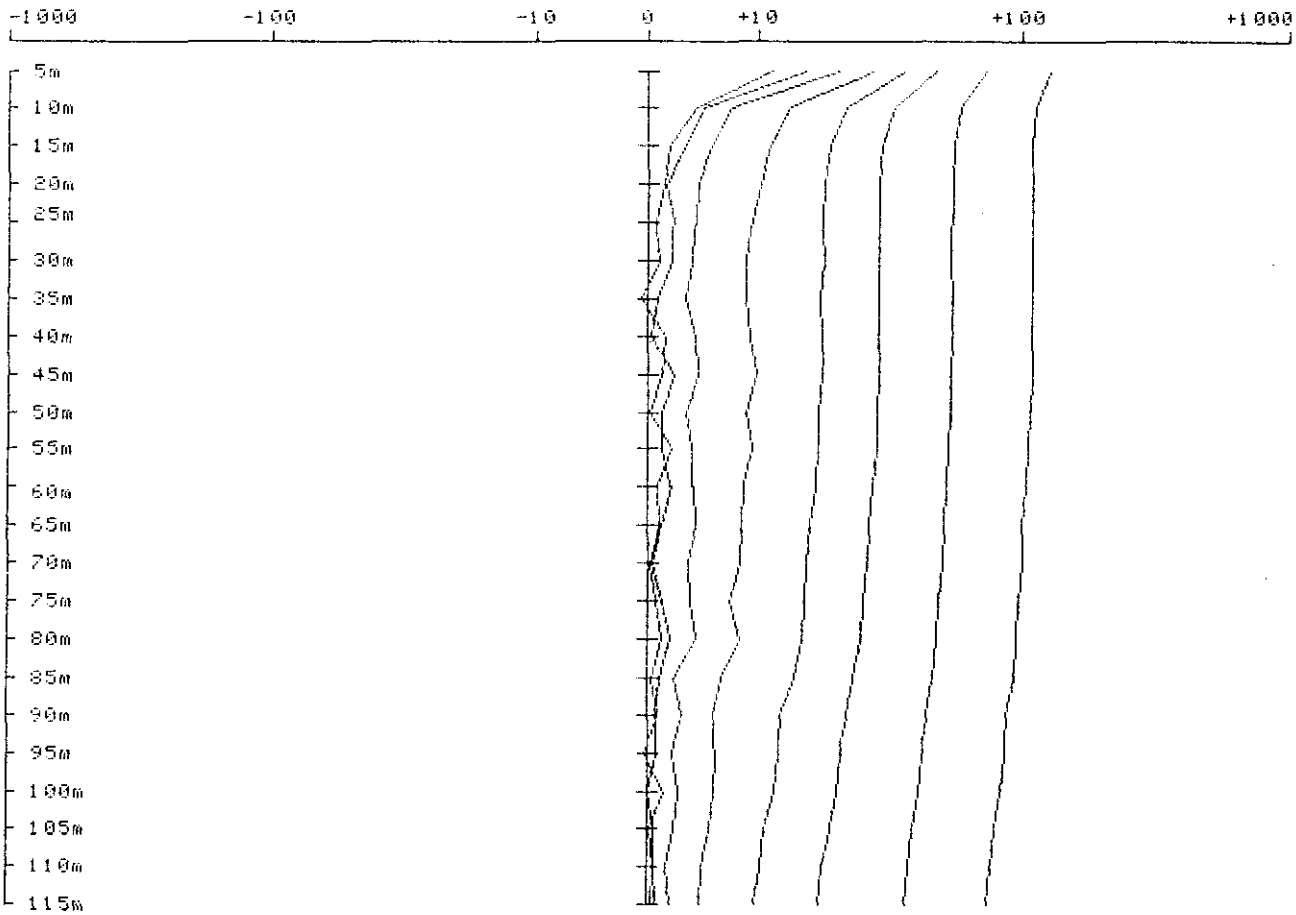
Grid	Hole	Tx Loop
MARIPOSA	HM846	2

Time base: 10ms
Ramp time: 0.5ms

ZTS: 131
Gain: 200

Date: 15/02/85

Scale: 1:1000



5 cm

MARIPOSA GRID
DOWN-HOLE PEM
DTM-84-6

AM/MG85/09 FIG. 8.

242

CRONE GEOPHYSICS Limited

BOREHOLE PEM

115244

Client
amco

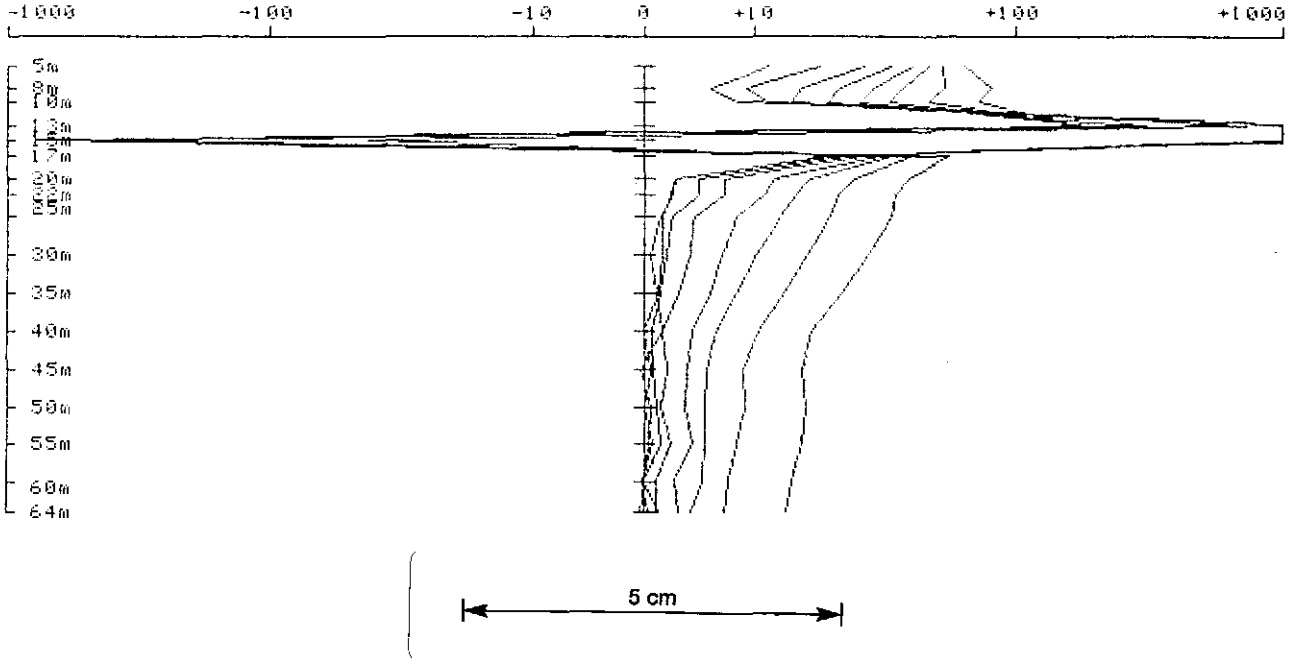
Grid	Hole	Tx Loop
MARIPOSA	HM847	3

Time base: 10ms
Ramp time: 0.5ms

ZTS: 127
Gain: 200

Date: 15/02/85

Scale: 1:1000



MARIPOSA GRID

DOWN-HOLE PEM

DTM-84-7

AM/MG85/09 FIG. 9.

243

CRONE GEOPHYSICS Limited
BOREHOLE PEM

115245

Client
AMOCO

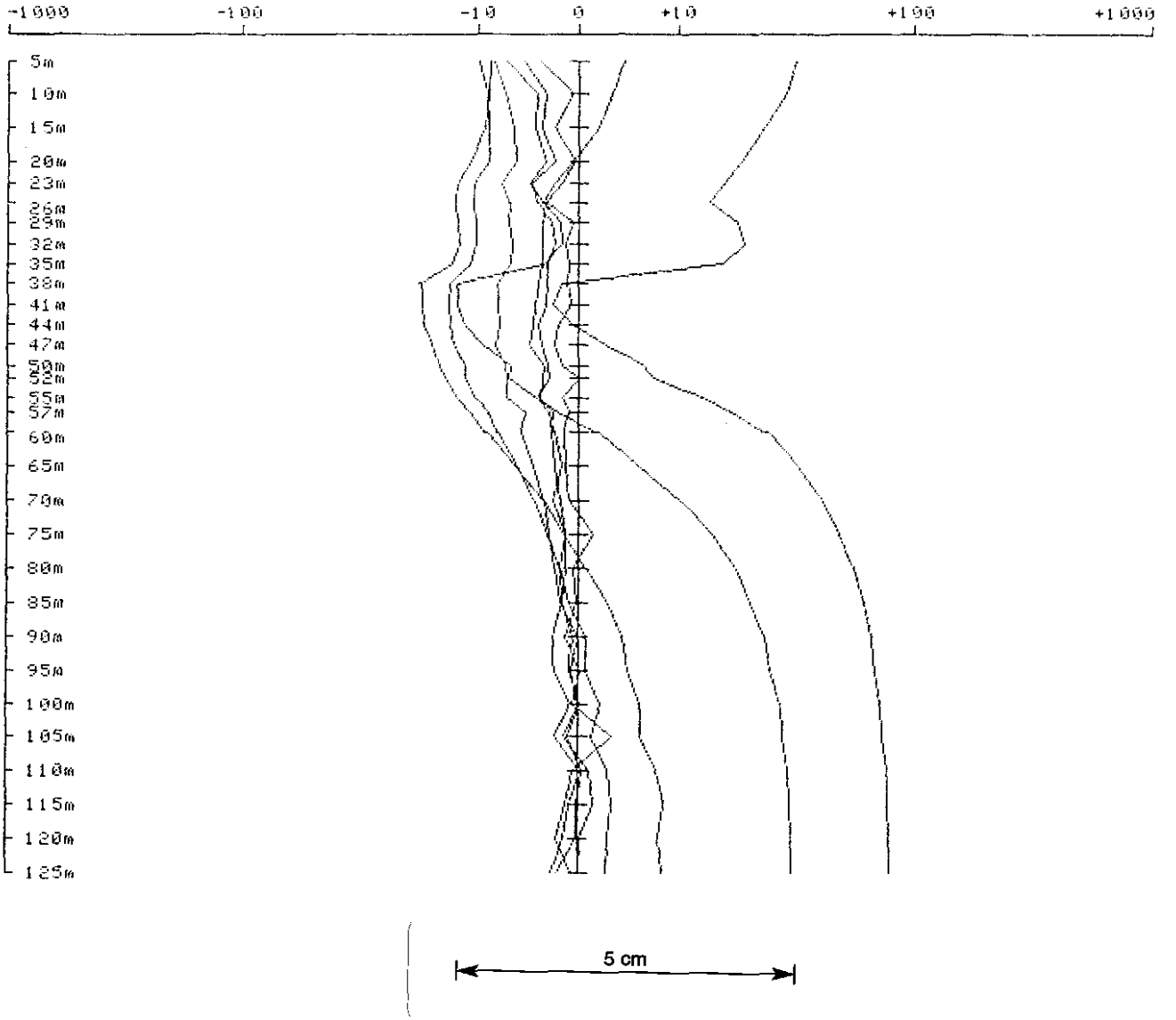
Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	2

Time base: 10ms
Ramp time: 0.5ms

ZTS: 125
Gain: 200

Date: 14/02/85

Scale: 1:1000



MARIPOSA GRID
DOWN-HOLE PEM
DTM-84-9
(eastern loop)

AM/MG85/09 FIG. 10a.

244

CRONE GEOPHYSICS Limited

115246

BOREHOLE PEM

Client
AMOCO

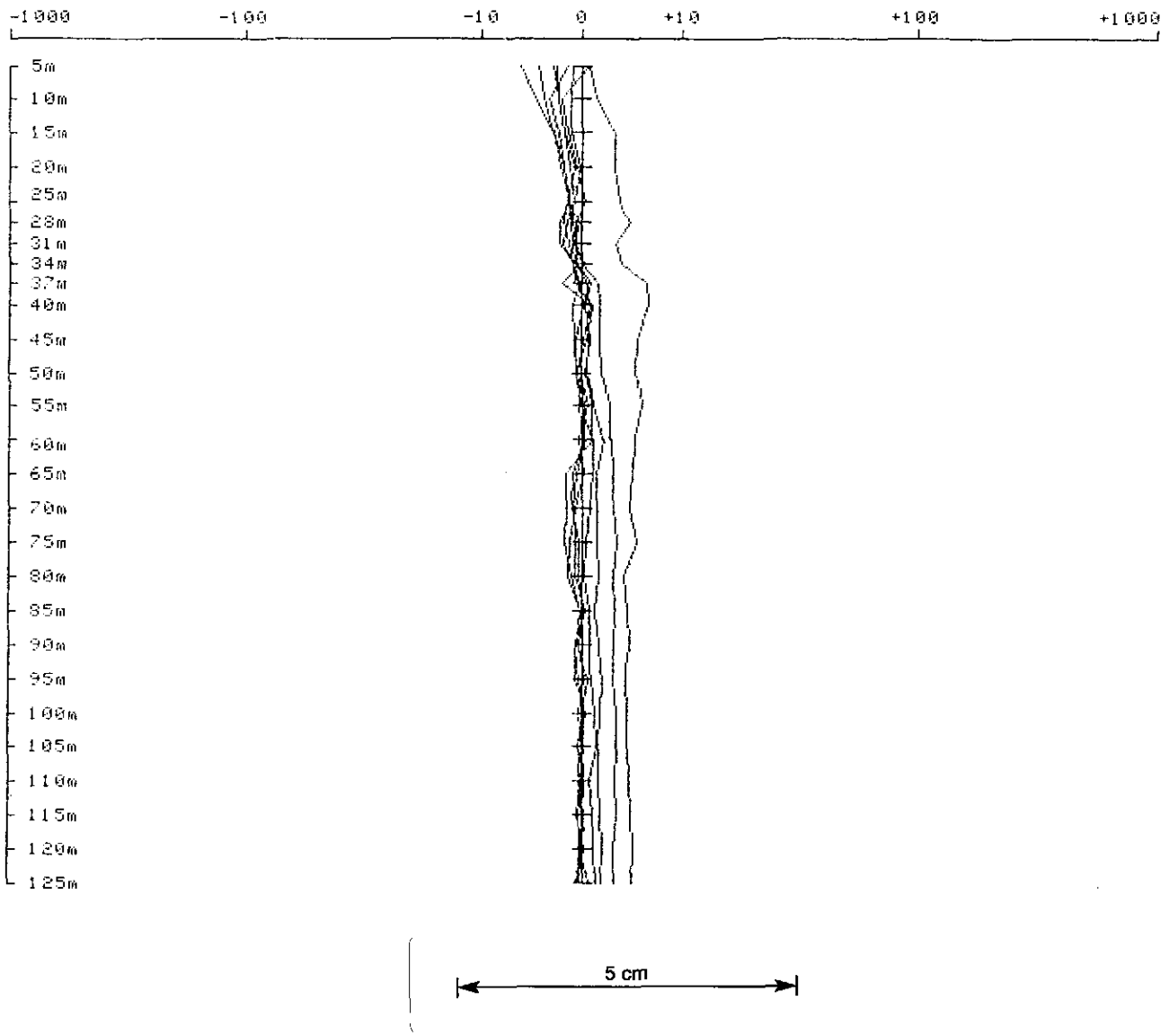
Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	6N

Time base: 10ms
Ramp time: 0.5ms

ZTS: 112
Gain: 200

Date: 17/02/85

Scale: 1:1000



MARIPOSA GRID
DOWN-HOLE PEM
DTM-84-9
(northern loop)

AM/MG85/09 FIG. 101

245

CRONE GEOPHYSICS Limited
BOREHOLE PEM

115247

Client
AMOCO

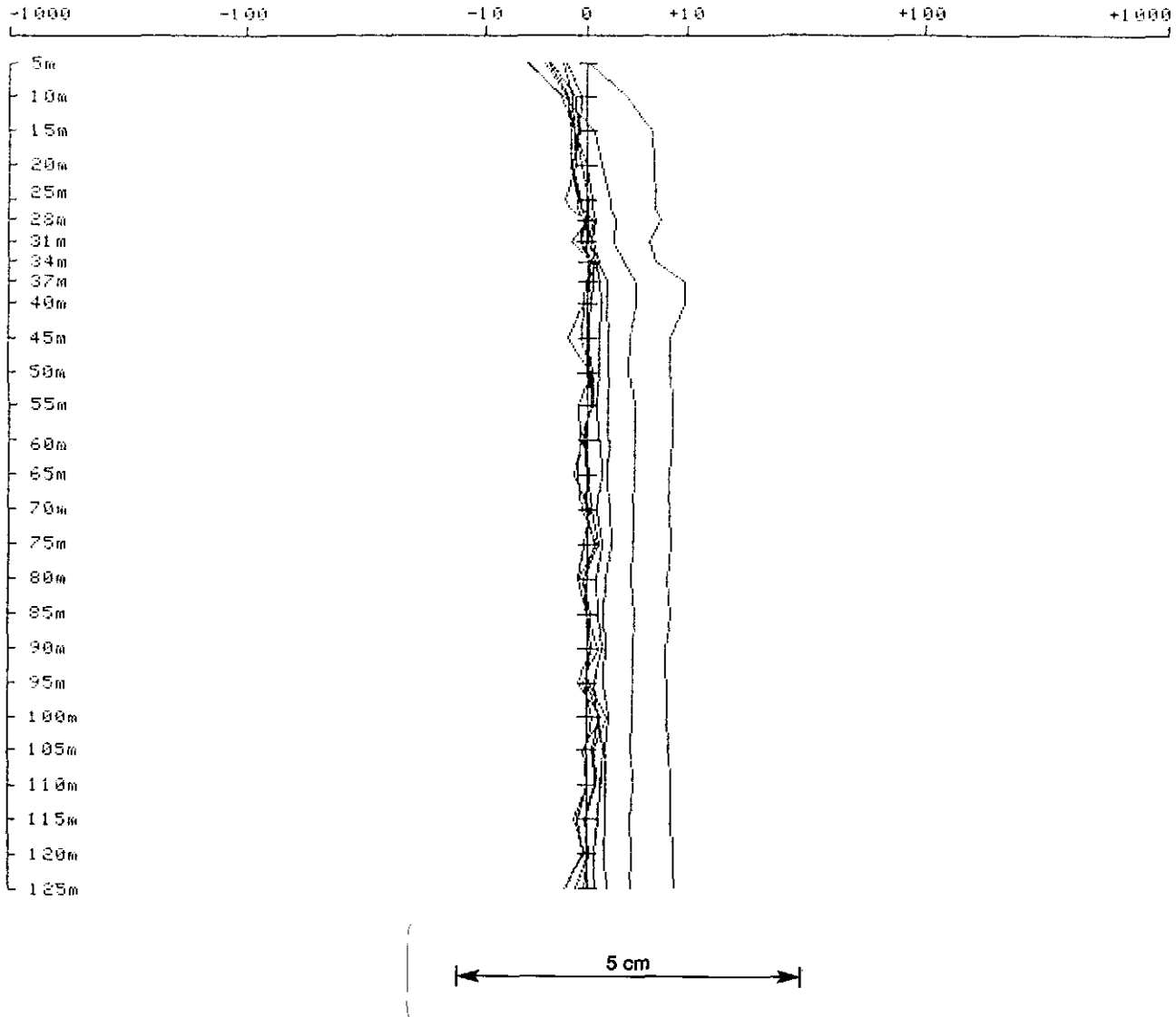
Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	SW

Time base: 10ms
Ramp time: 0.5ms

ZTS: 114
Gain: 200

Date: 17/02/85

Scale: 1:1000



MARIPOSA GRID
DOWN-HOLE PEM
DTM-84-9
(western loop)

AM/MG85/09 FIG. 10c.

246

CRONE GEOPHYSICS Limited

BOREHOLE PEM

115248

Client
AMOCO

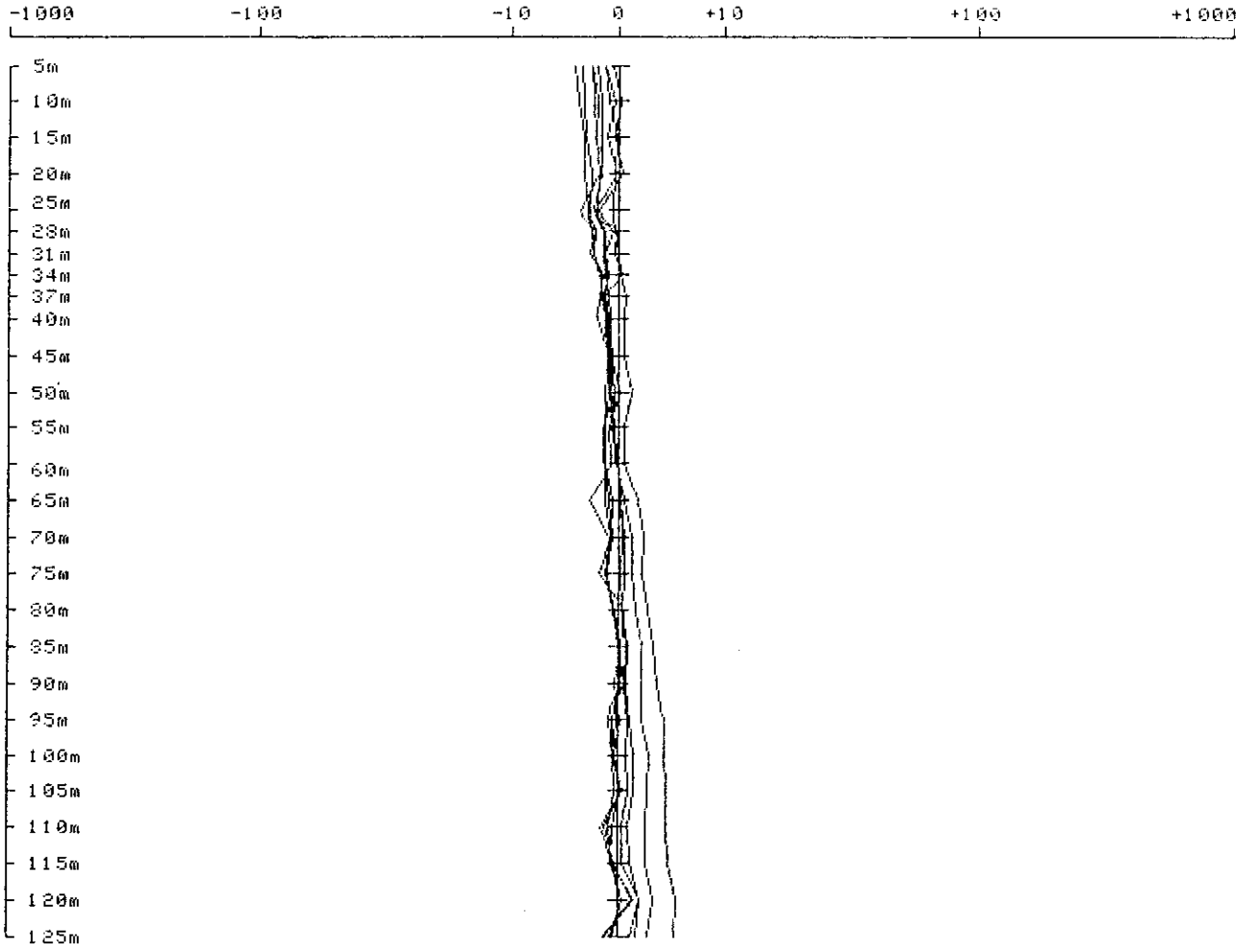
Grid	Hole	Tx Loop
MARIPOSA	DTM84-9	4S

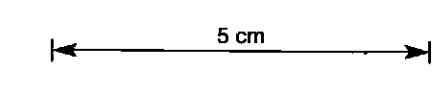
Time base: 10ms
Ramp time: 0.5ms

ZTS: 115
Gain: 200

Date: 17/02/85

Scale: 1:1000





MARIPOSA GRID
DOWN-HOLE PEM
DTM-84-9
(southern loop)

AM/MG85/09 FIG. 10d

247

115249

CRONE GEOPHYSICS Limited

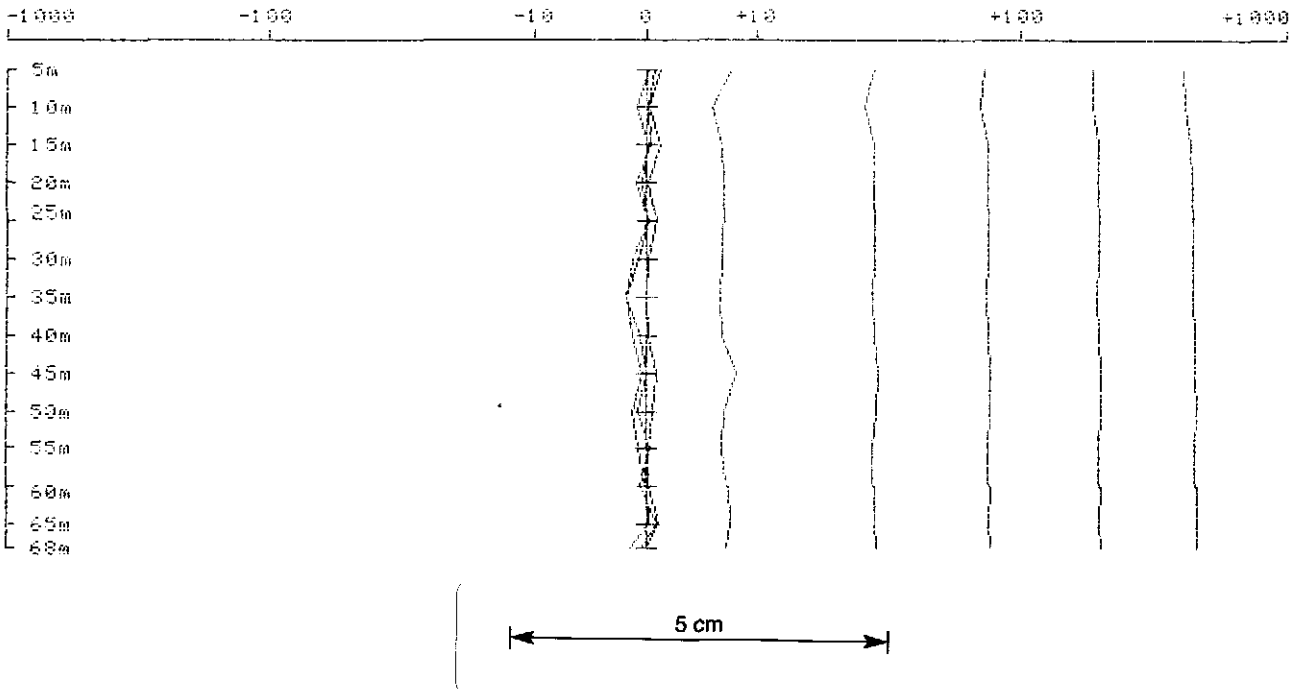
BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
SUNCORNER	HSC84-2	9

Time base: 10ms	ZTS: 125	Date: 13/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:1000



SUNNY CORNER
DOWN-HOLE PEM
DTSC-84-2

AM/MG85/09 FIG. 16.

248

115250

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

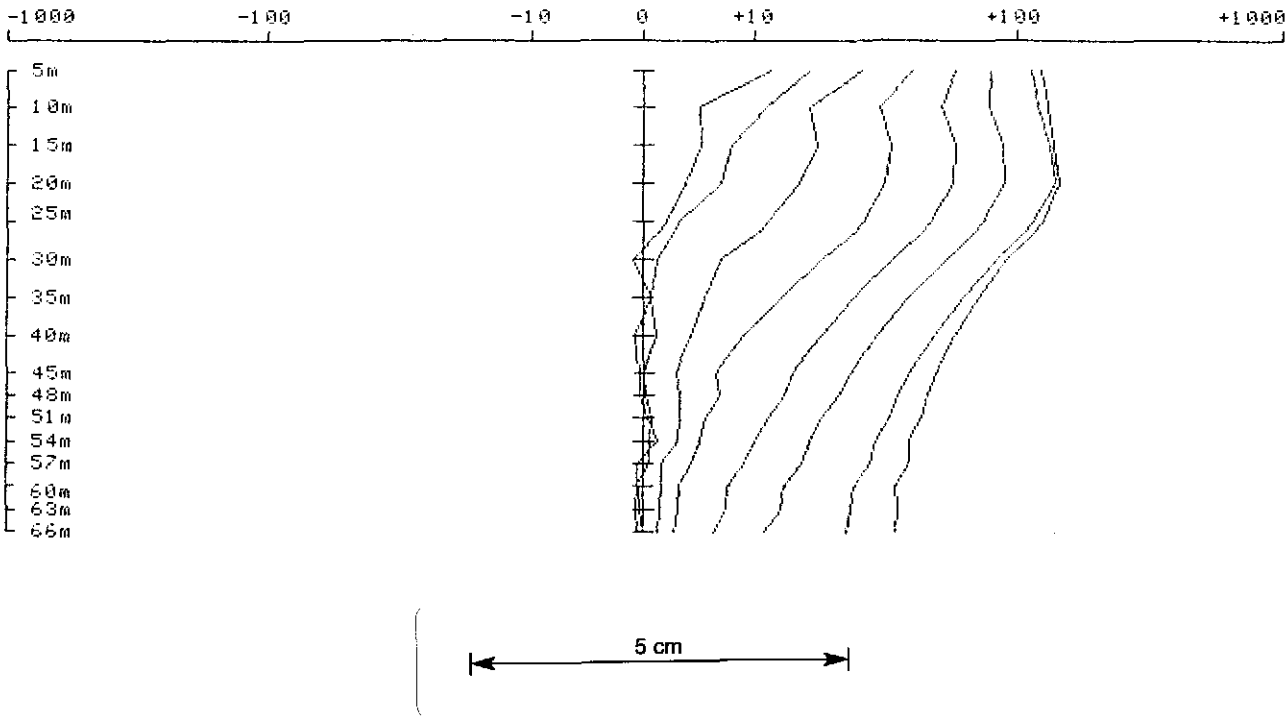
Grid	Hole	Tx Loop
SUNCORNER	DTSC84-3	8

Time base: 10ms
Ramp time: 0.5ms

ZTS: 119
Gain: 200

Date: 18/02/85

Scale: 1:1000



SUNNY CORNER
DOWN-HOLE PEM
DTSC-84-3

AM/MG85/09 FIG. 17.

249

115251

CRONE GEOPHYSICS Limited

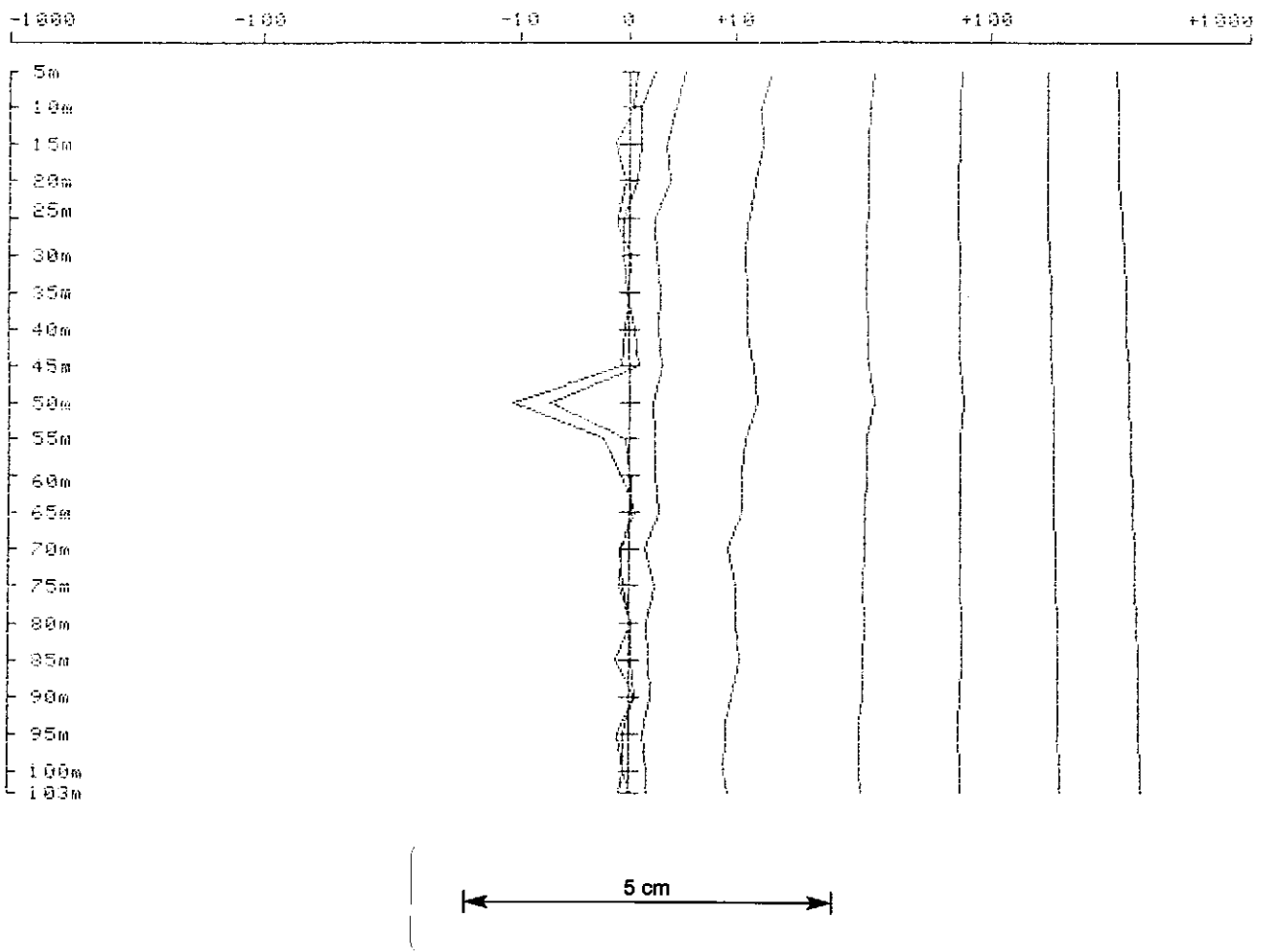
BOREHOLE PEM

Client
AMOCO

Grid	Hole	Tx Loop
SUNCORNER	HSC84-4	9

Time base: 10ms	ZTS: 125	Date: 19/02/85
Ramp time: 0.5ms	Gain: 200	

Scale: 1:1000



SUNNY CORNER
DOWN-HOLE PEM

DTSC-84-4

AM/MG85/09 FIG. 18

250

115252

CRONE GEOPHYSICS Limited

BOREHOLE PEM

Client
AMOCO

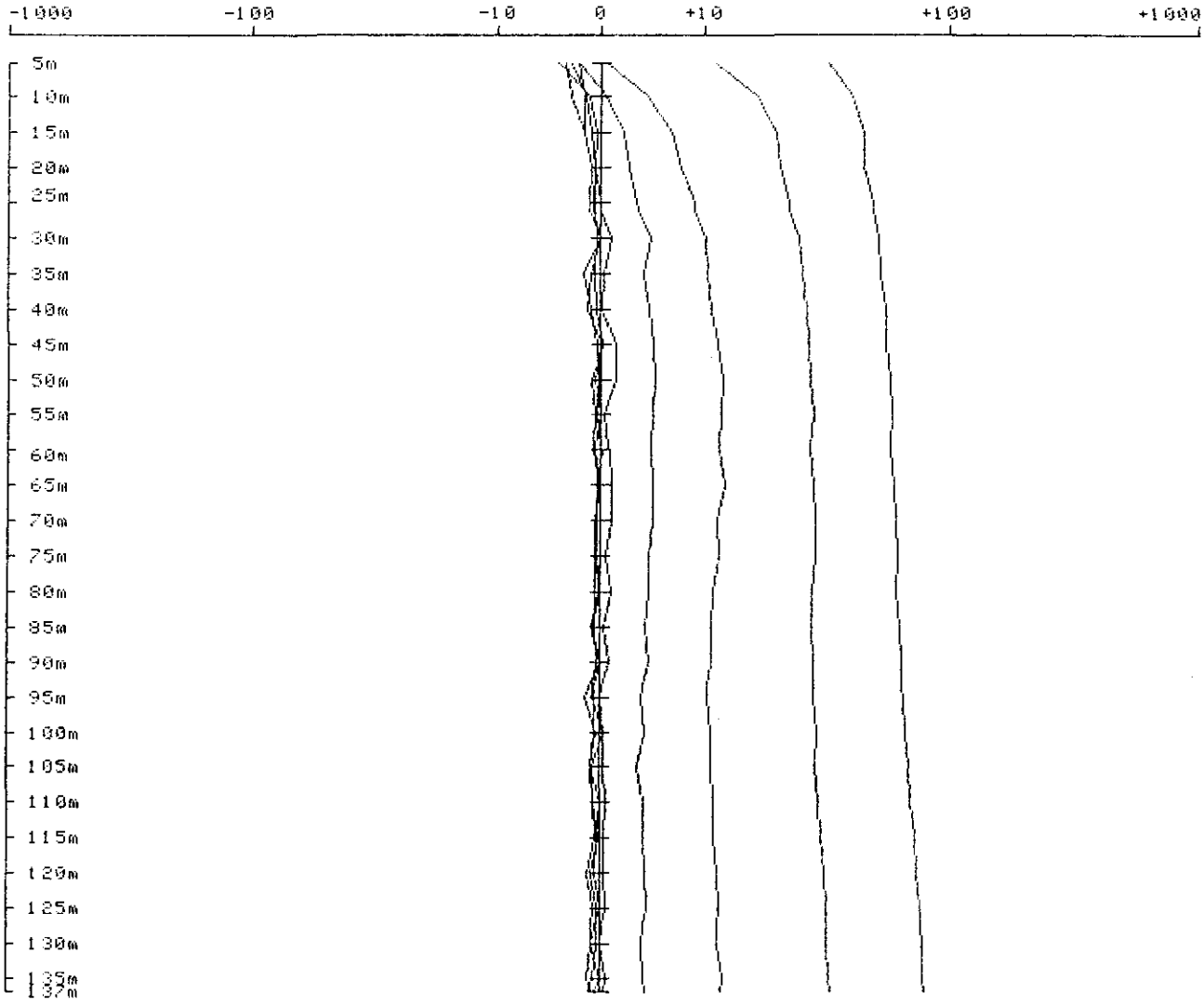
Grid	Hole	Tx Loop
SUNCORNER	DTSC84-5	7

Time base: 10ms
Ramp time: 0.5ms

ZTS: 123
Gain: 200

Date: 18/02/85

Scale: 1:1000



5 cm

SUNNY CORNER
DOWN-HOLE PEM

DTSC-84-5A

AM/MG85/09 FIG. 19

APPENDIX 6

WACKER PERCUSSION BEDROCK SAMPLING - INCLUDES
ANALYTICAL RESULT SHEETS

67300 E

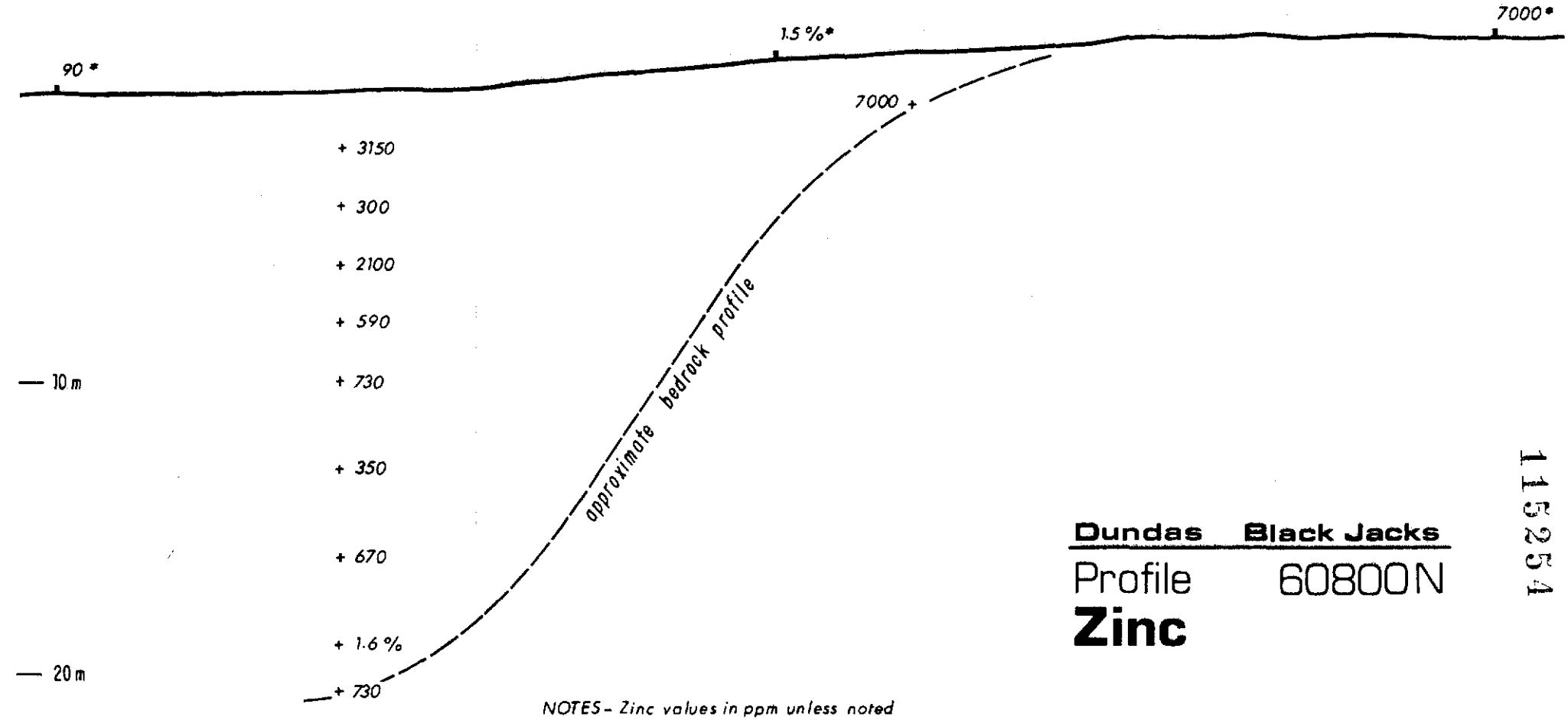
67350 E

4m of 0.4% Pb, 5.0% Zn, 62.5 g/t Ag

16m of 0.2% Pb, 1.9% Zn, 4.3 g/t Ag

COSTEAN

Line 60800N



NOTES - Zinc values in ppm unless noted
* Jackro zinc values

Dundas Black Jacks

Profile 60800N

Zinc

115254

67300 E

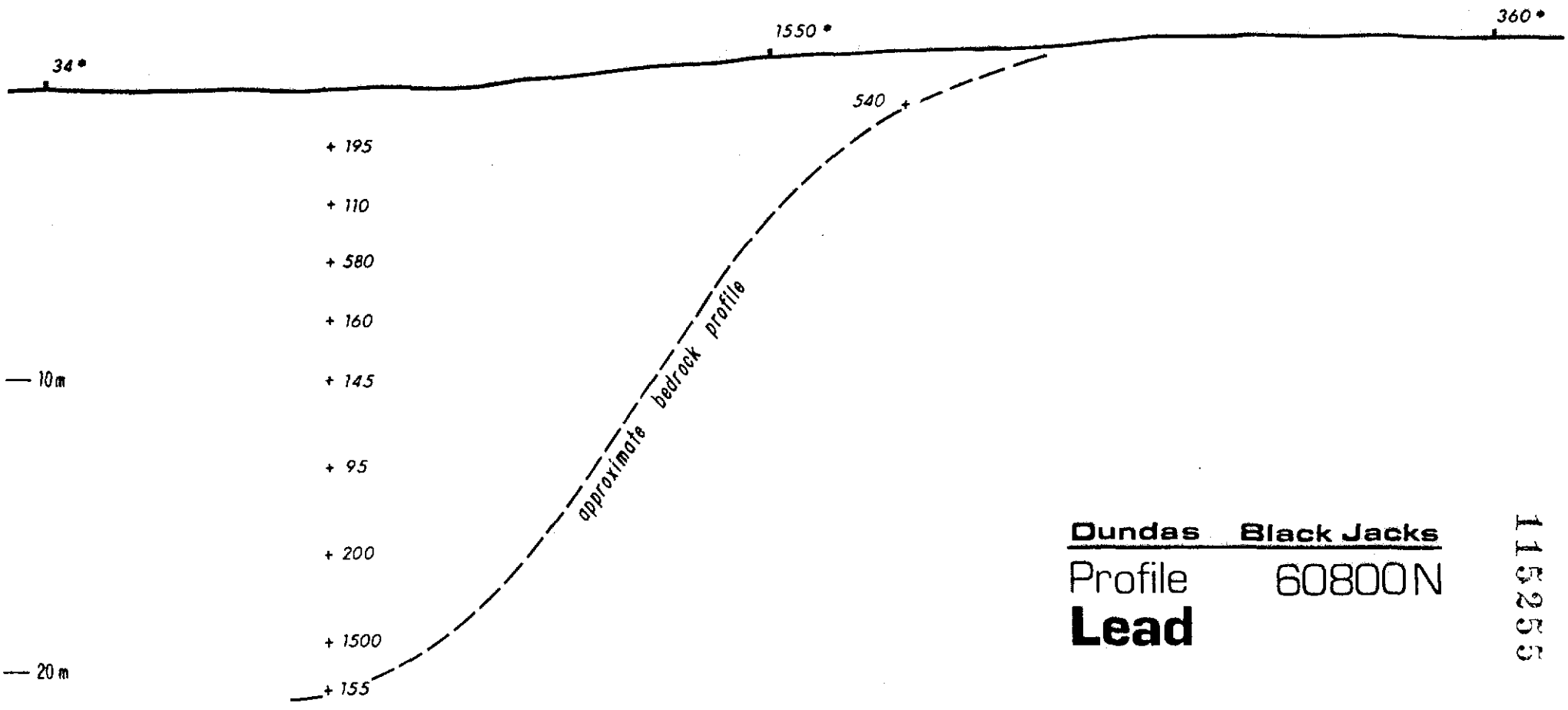
67350 E

16m of 0·2% Pb, 1·9 % Zn, 4·3 g/t Ag

4m of 0·4 % Pb, 5·0 % Zn, 62·5 g/t Ag

COSTEAN

Line 60800 N

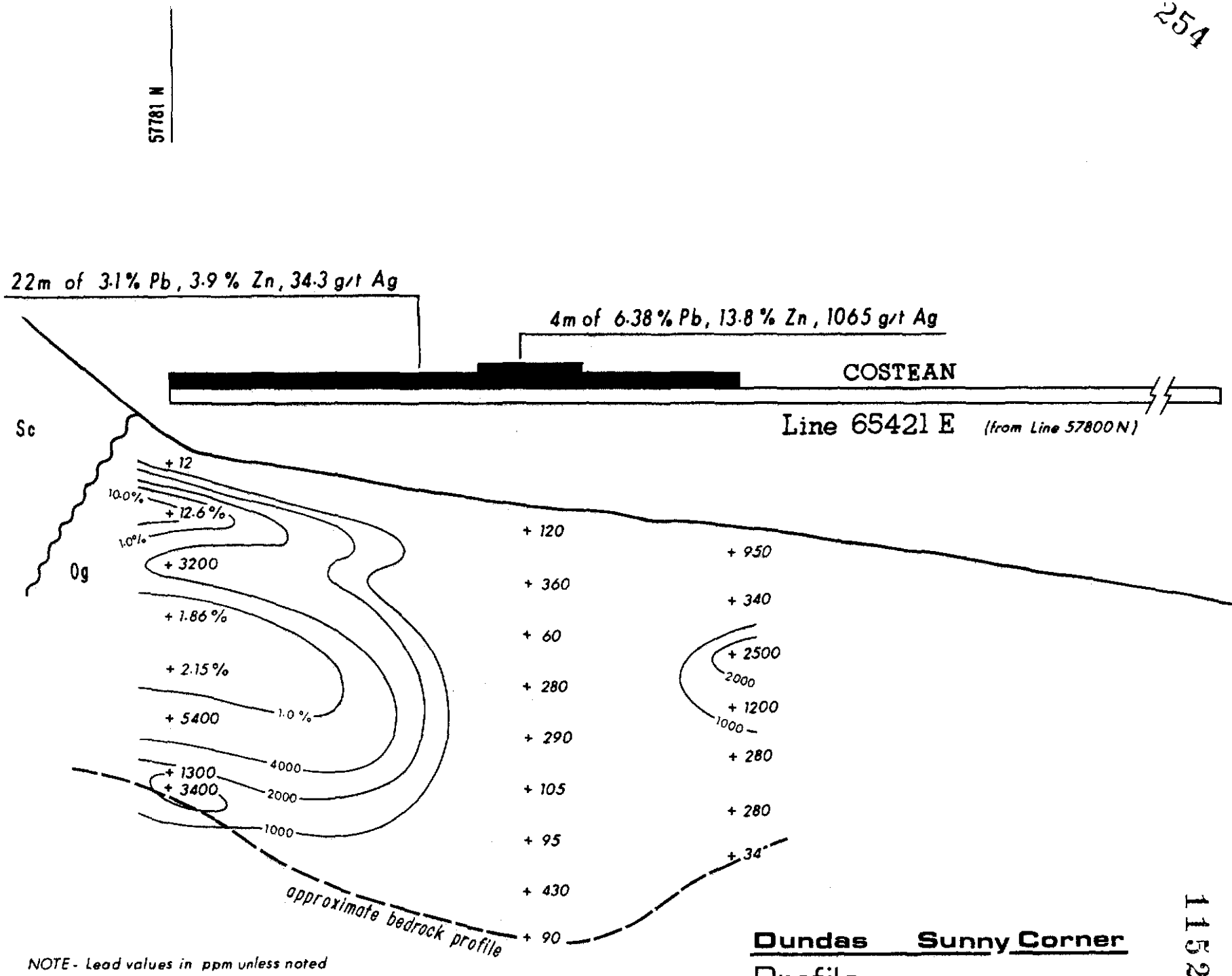


Dundas Black Jacks

Profile 60800N

Lead

NOTES - Lead values in ppm unless noted
* Jackro lead values

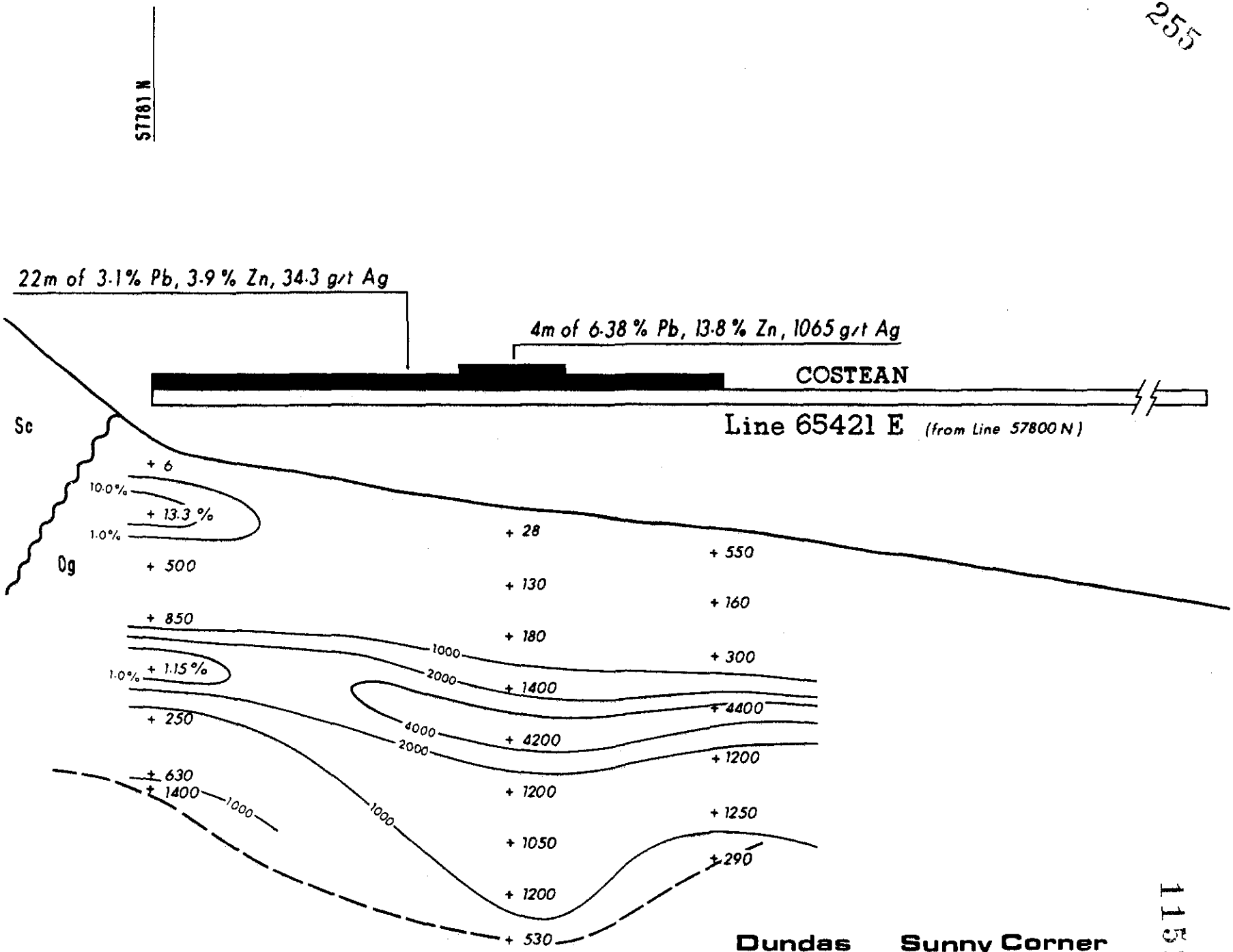


NOTE - Lead values in ppm unless noted

Dundas Sunny Corner

Profile

Lead



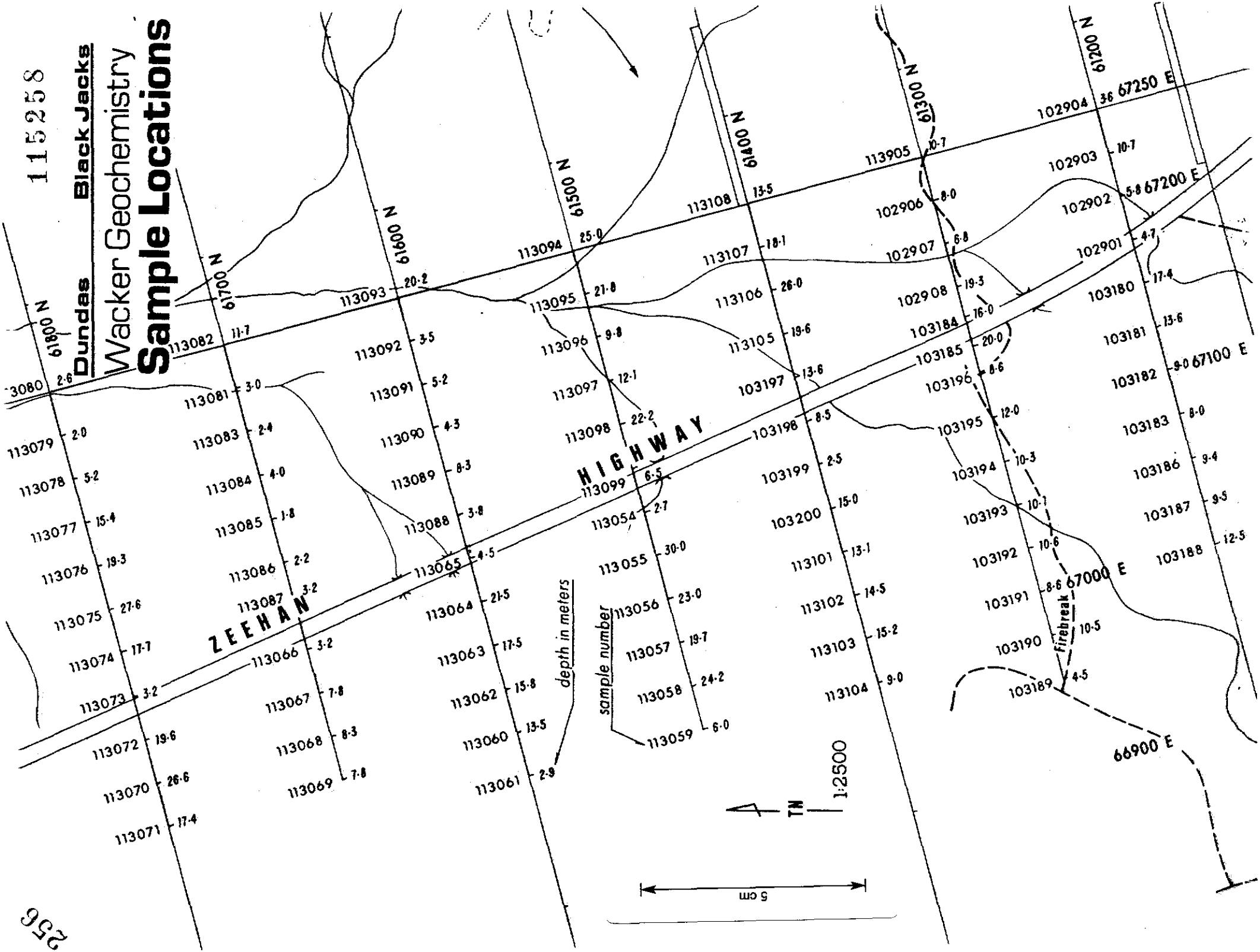
NOTE - Zinc values in ppm unless noted

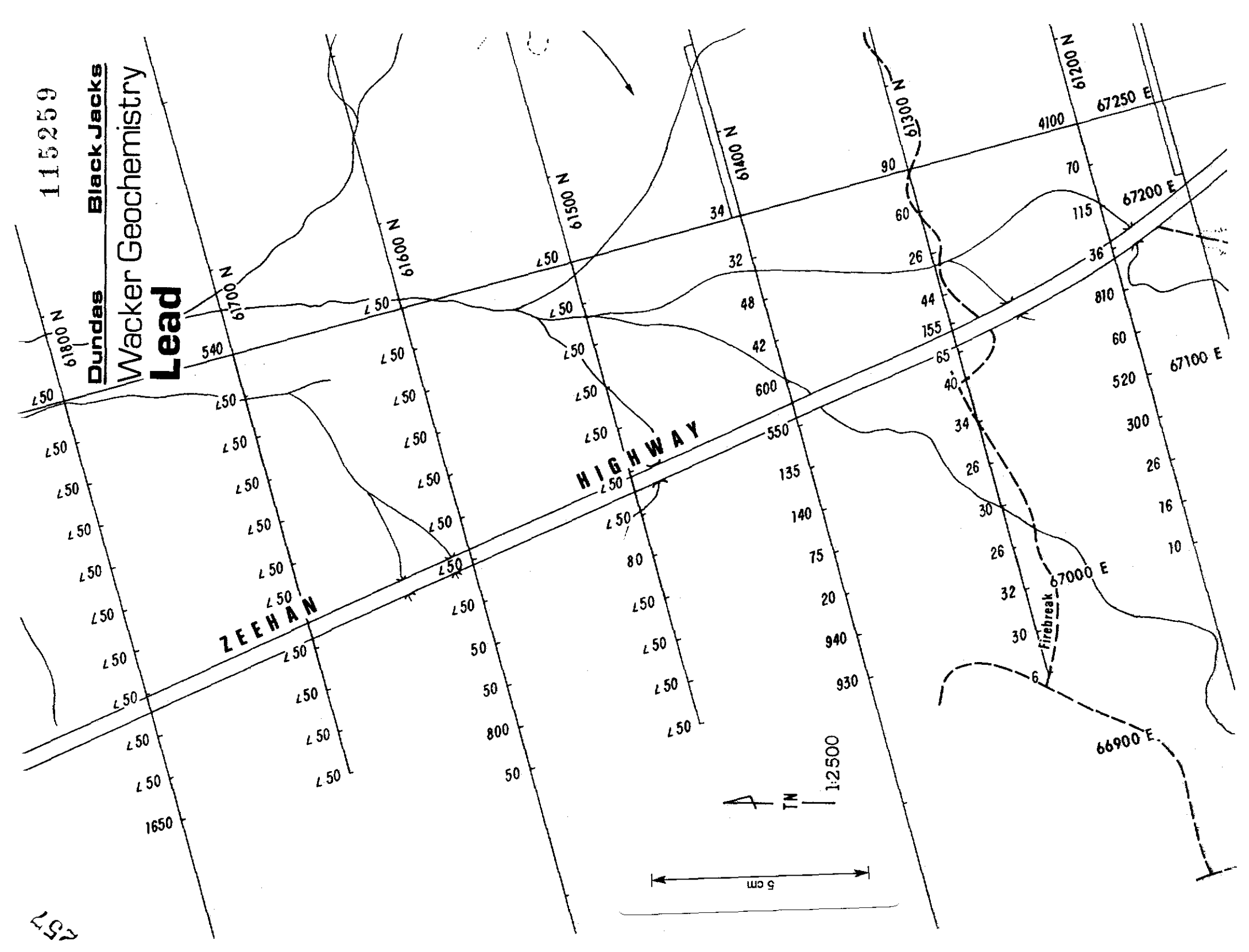
Dundas Sunny Corner

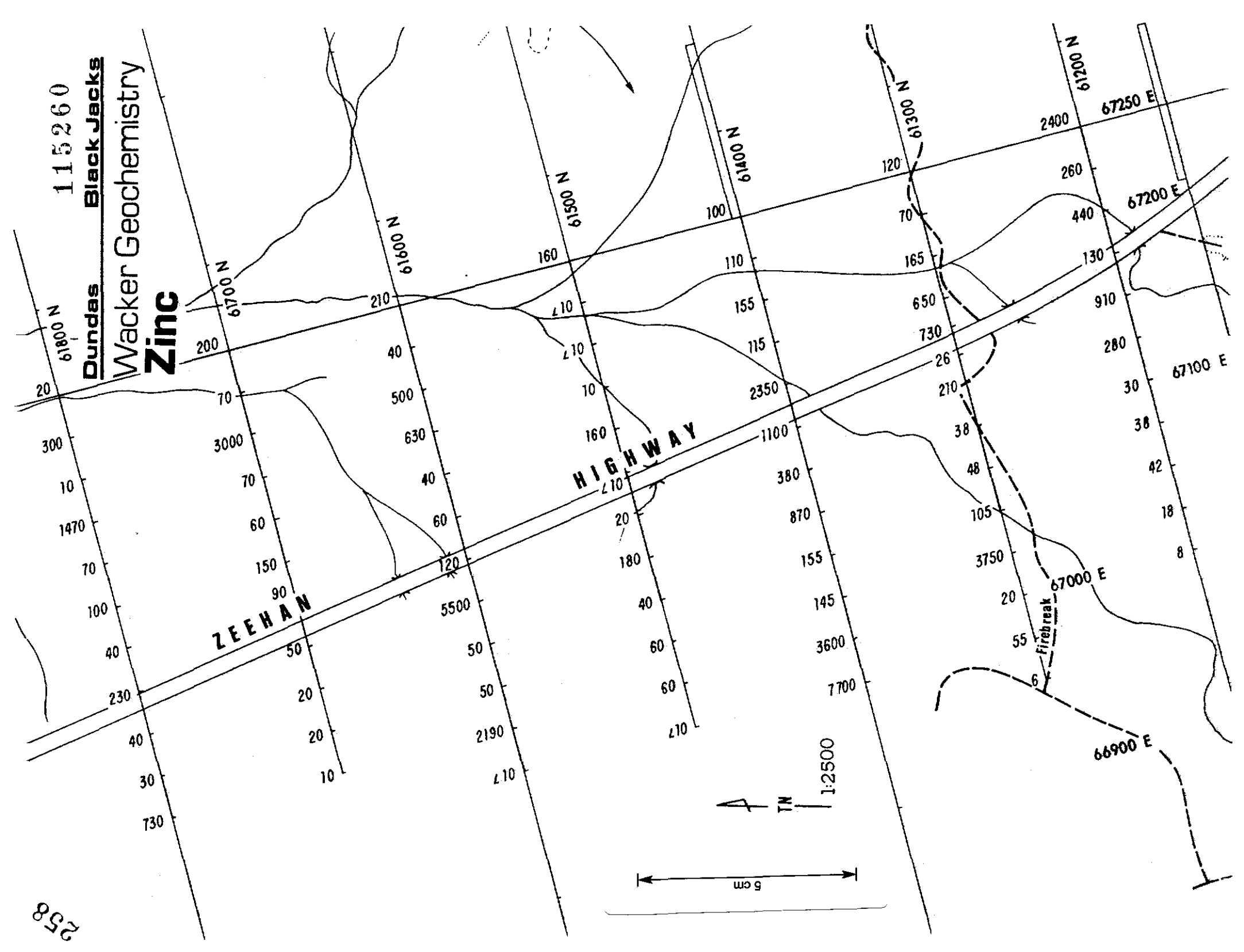
Profile

Zinc

11525-1


115258
Dundas Black Jacks
Wacker Geochemistry
Sample Locations
61800 N
61700 N
61600 N
61500 N
61400 N
61300 N
61200 N
67250 E
67200 E
67100 E
67000 E
66900 E
HIGHWAY
ZEEHAN
Firebreak
depth in meters
sample number
TN
1:2500
5 cm
113080 2.6
113079 2.0
113078 5.2
113077 15.4
113076 19.3
113075 27.6
113074 17.7
113073 3.2
113072 19.6
113070 26.6
113071 17.4
113081 3.0
113083 2.4
113084 4.0
113085 1.8
113086 2.2
113087 3.2
113066 3.2
113067 7.8
113068 8.3
113069 7.8
113082 11.7
113093 20.2
113092 3.5
113091 5.2
113090 4.3
113089 8.3
113088 3.8
113065 4.5
113064 21.5
113063 17.5
113062 15.8
113060 13.5
113061 2.9
113094 25.0
113095 21.8
113096 9.8
113097 12.1
113098 22.2
113099 6.5
113054 2.7
113055 30.0
113056 23.0
113057 19.7
113058 24.2
113059 6.0
113108 13.5
113107 18.1
113106 26.0
113105 19.6
103197 13.6
103198 8.5
103199 2.5
103200 15.0
113101 13.1
113102 14.5
113103 15.2
113104 9.0
113905 10.7
102906 8.0
102907 6.8
102908 19.3
103184 16.0
103185 20.0
103196 8.6
103195 12.0
103194 10.3
103193 10.7
103192 10.6
103191 8.6
103190 10.5
103189 4.5
102904 36
102903 10.7
102902 5.8
102901 4.7
103180 17.4
103181 13.6
103182 9.0
103183 8.0
103186 9.4
103187 9.5
103188 12.5


115259
Dundas Black Jacks
Wacker Geochemistry
Lead
61800 N
61700 N
61600 N
61500 N
61400 N
61300 N
61200 N
67250 E
67200 E
67100 E
67000 E
66900 E
HIGHWAY
ZEEHAN
Firebreak
TN
1:2500
5 cm


115260
Dundas Black Jacks
Wacker Geochemistry
Zinc
61800 N
61700 N
61600 N
61500 N
61400 N
61300 N
61200 N
67250 E
67200 E
67100 E
67000 E
66900 E
HIGHWAY
ZEEHAN
Firebreak
TN
1:2500
5 cm
258

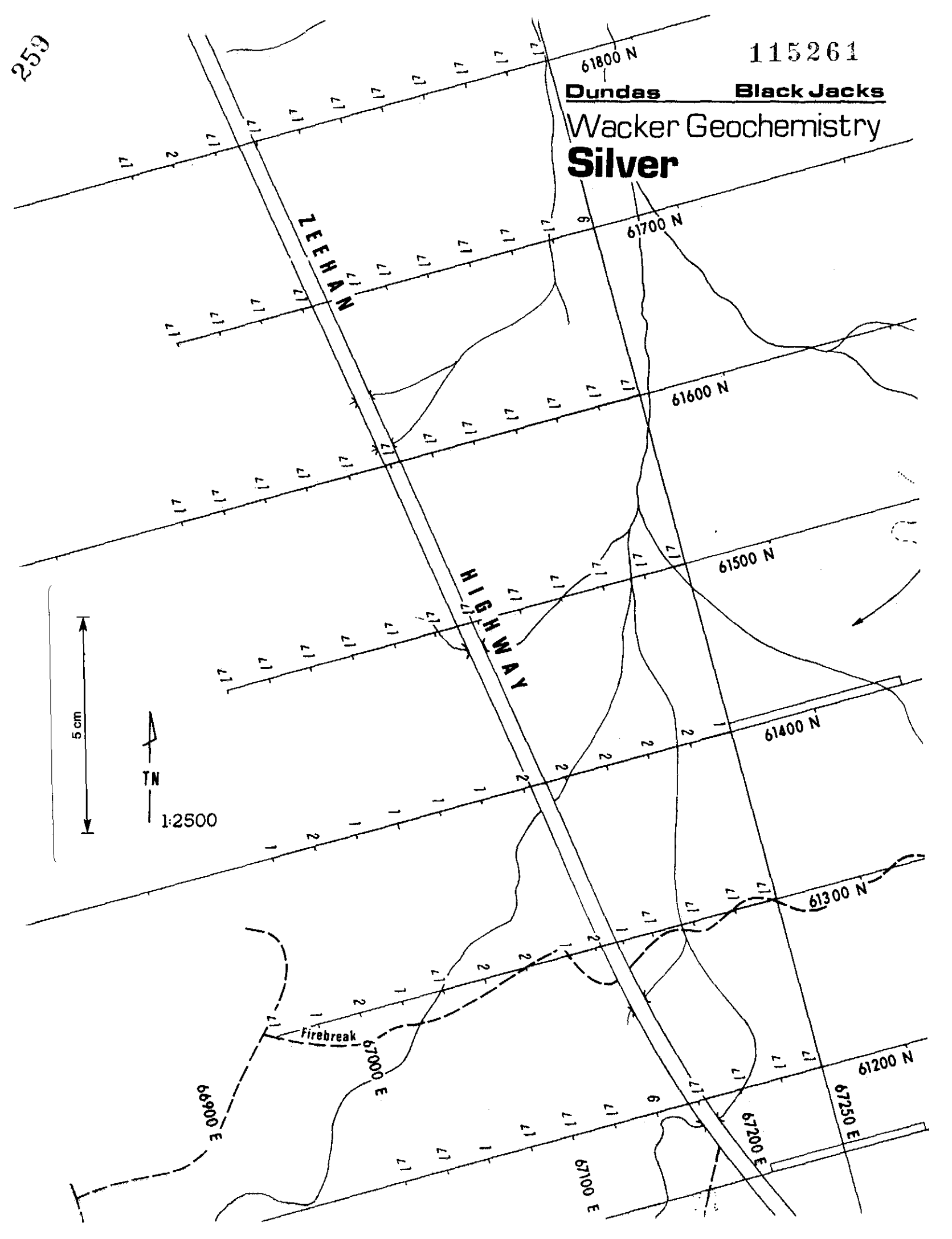
259

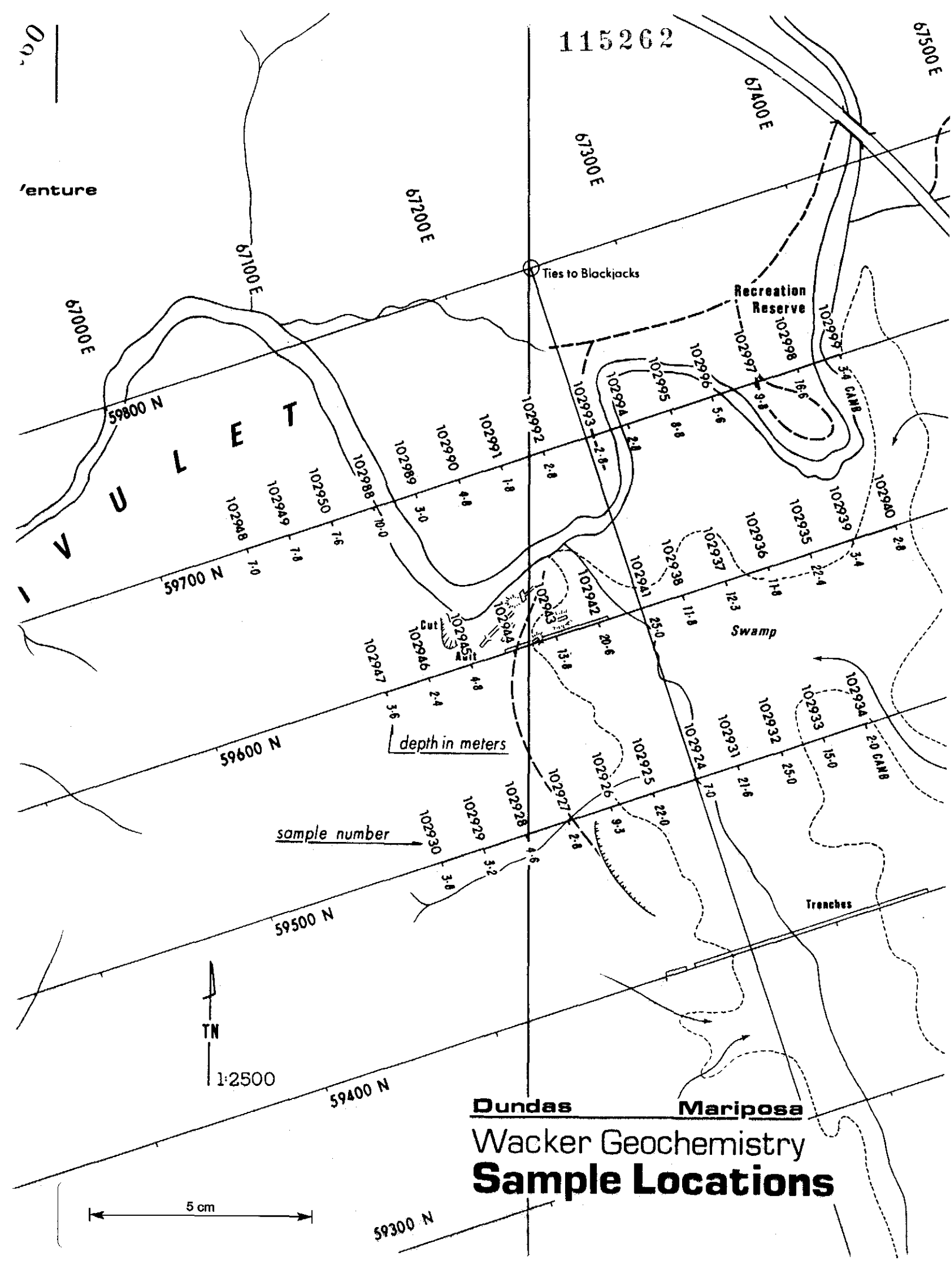
115261

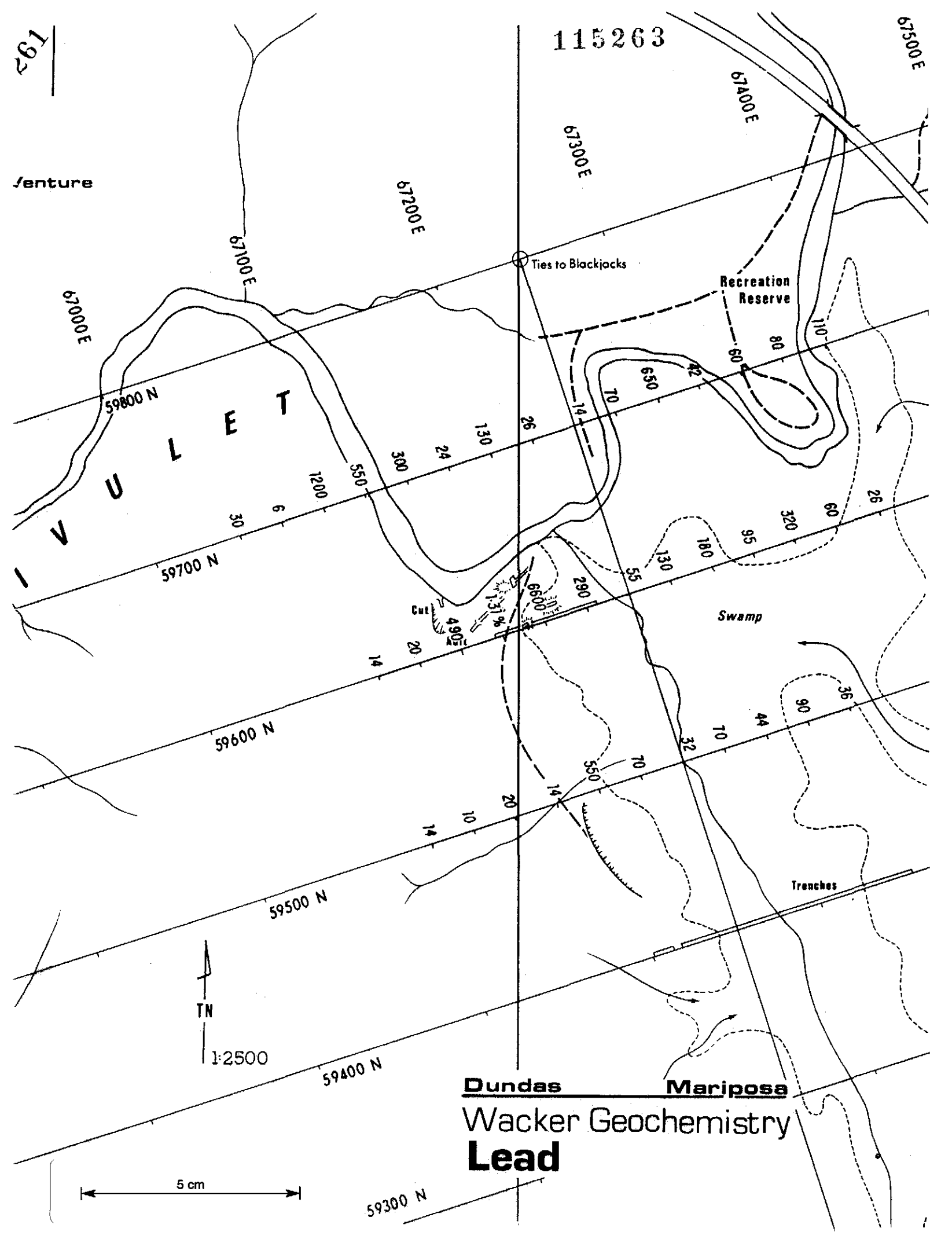
Dundas Black Jacks

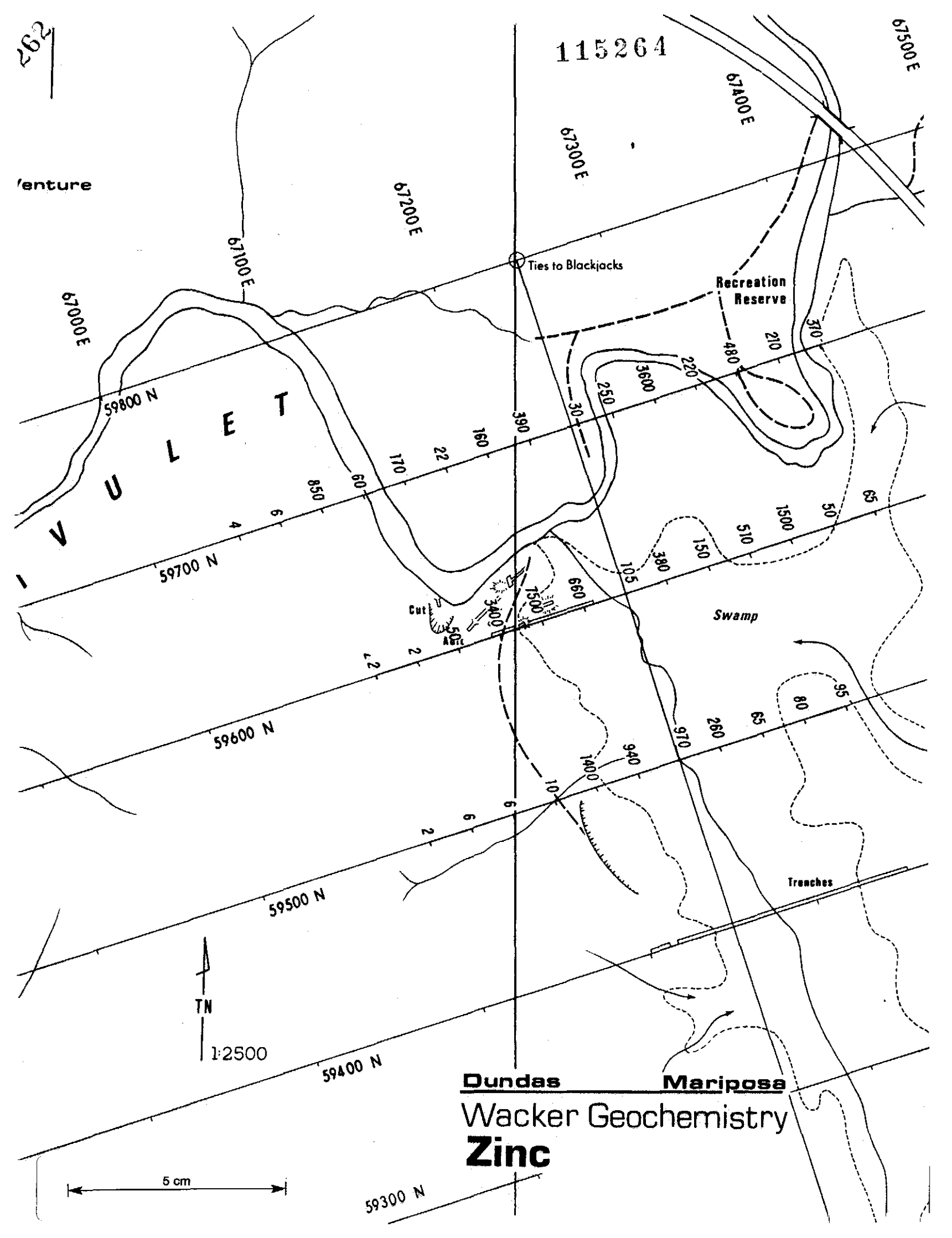
Wacker Geochemistry

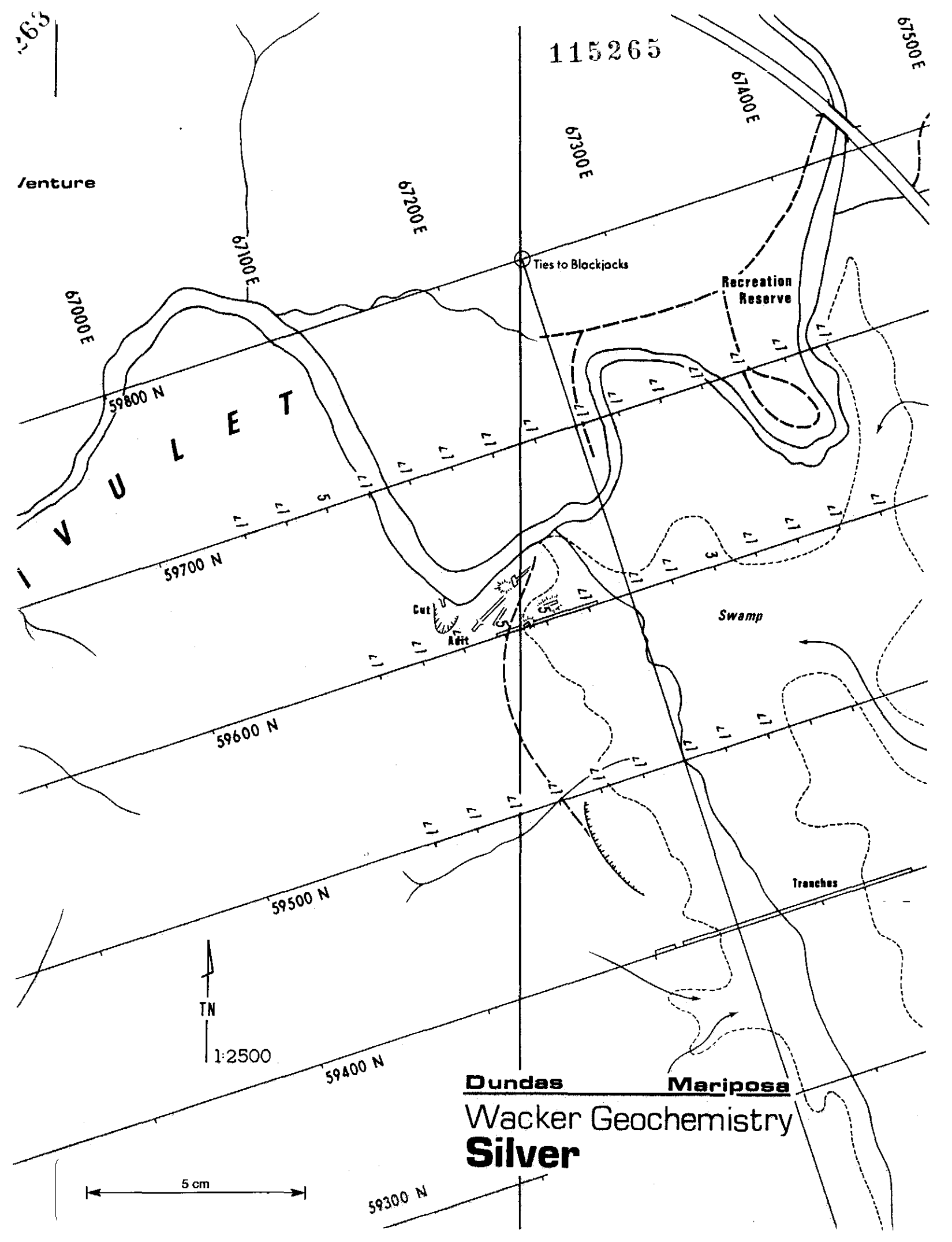
Silver



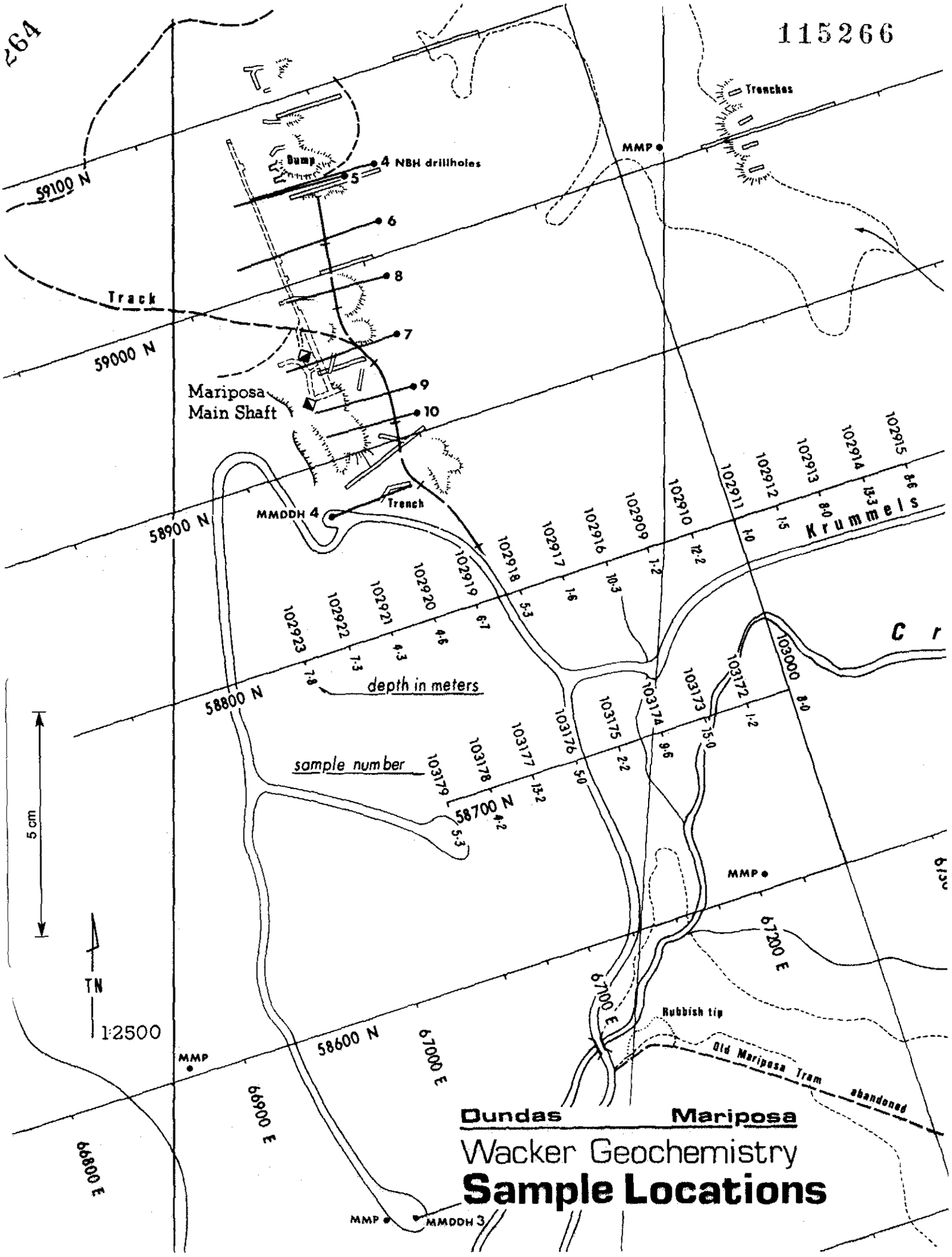

115262
67500 E
67400 E
67300 E
67200 E
67100 E
67000 E
'enture
Ties to Blackjacks
Recreation Reserve
59800 N
59700 N
59600 N
59500 N
59400 N
59300 N
I V U L E T
Cut
Swamp
Trenches
depth in meters
sample number
TN
1:2500
5 cm
Dundas Mariposa
Wacker Geochemistry
Sample Locations


115263
67500 E
67400 E
67300 E
67200 E
67100 E
67000 E
Venture
Ties to Blackjacks
Recreation Reserve
59800 N
59700 N
59600 N
59500 N
59400 N
59300 N
I V U L E T
Cut
Swamp
Trenches
TN
1:2500
Dundas Mariposa
Wacker Geochemistry
Lead
5 cm


262
115264
67500 E
67400 E
67300 E
67200 E
67100 E
67000 E
venture
Ties to Blackjacks
Recreation Reserve
59800 N
59700 N
59600 N
59500 N
59400 N
59300 N
Cut
Swamp
Trenches
TN
1:2500
5 cm
Dundas Mariposa
Wacker Geochemistry
Zinc


115265
67500 E
67400 E
67300 E
67200 E
67100 E
67000 E
Venture
Ties to Blackjacks
Recreation Reserve
59800 N
59700 N
59600 N
59500 N
59400 N
59300 N
Cut
Adit
Swamp
Trenches
TN
1:2500
5 cm
Dundas Maripose
Wacker Geochemistry
Silver

115266

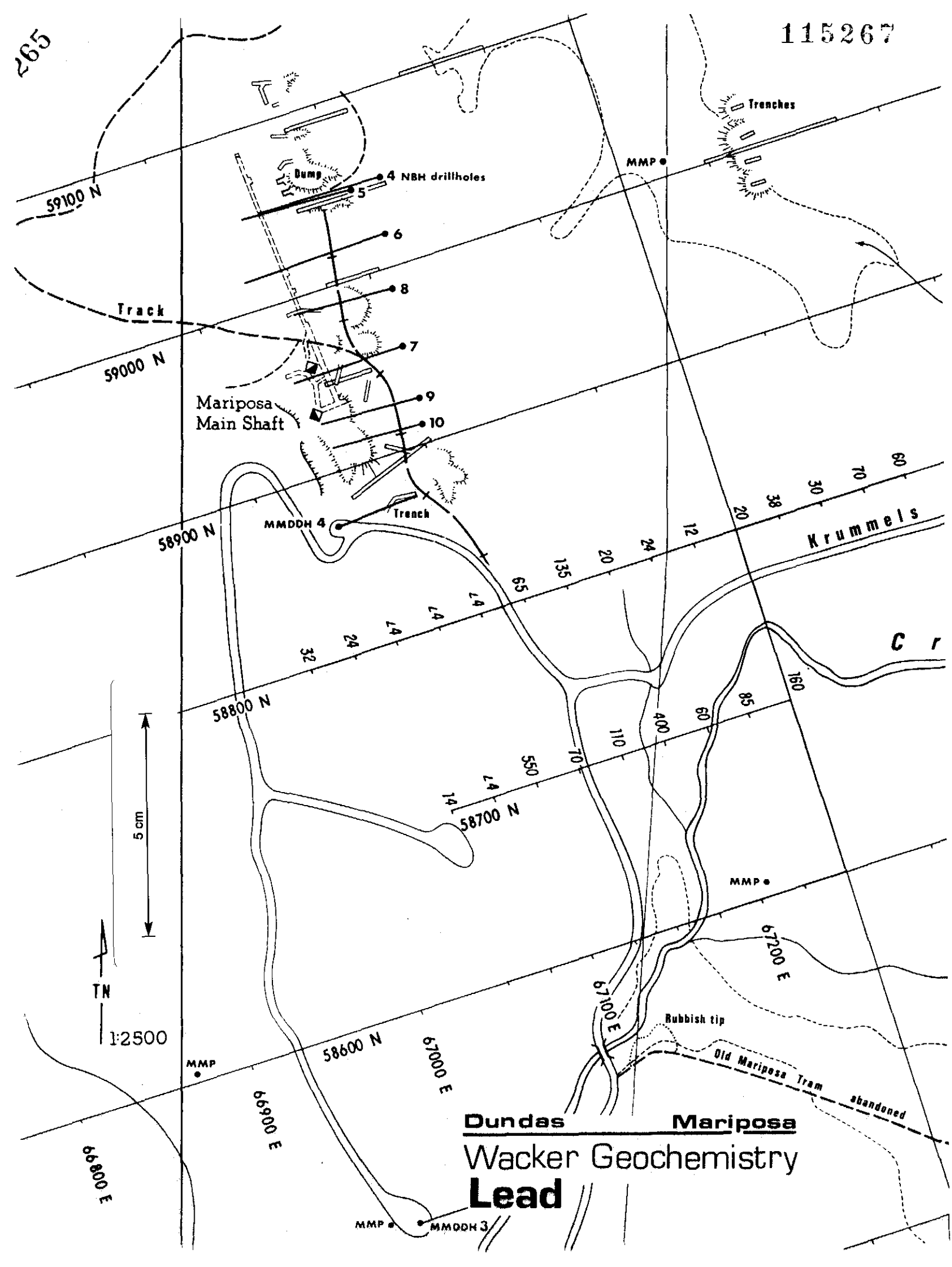


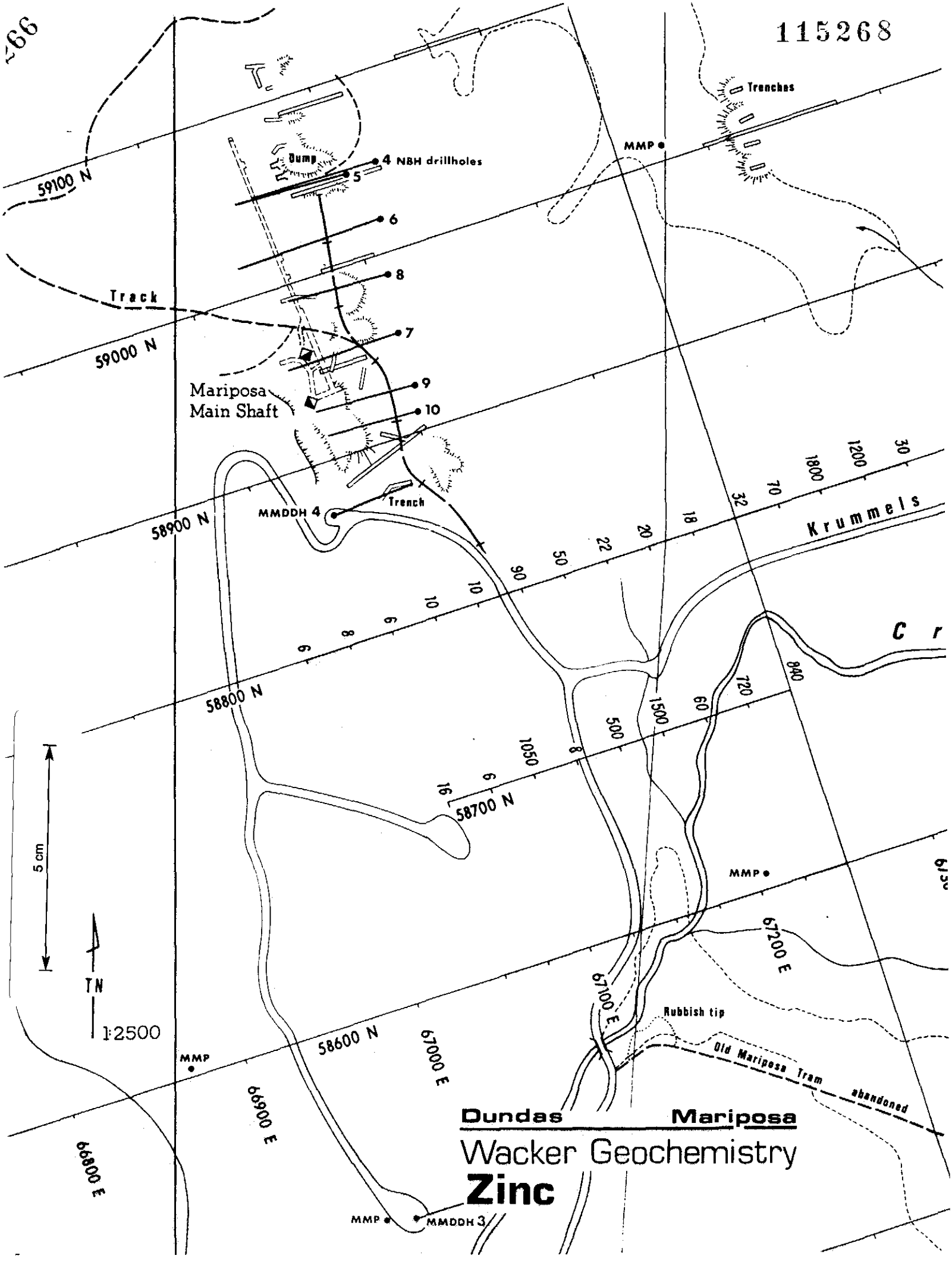
Dundas Mariposa

Wacker Geochemistry

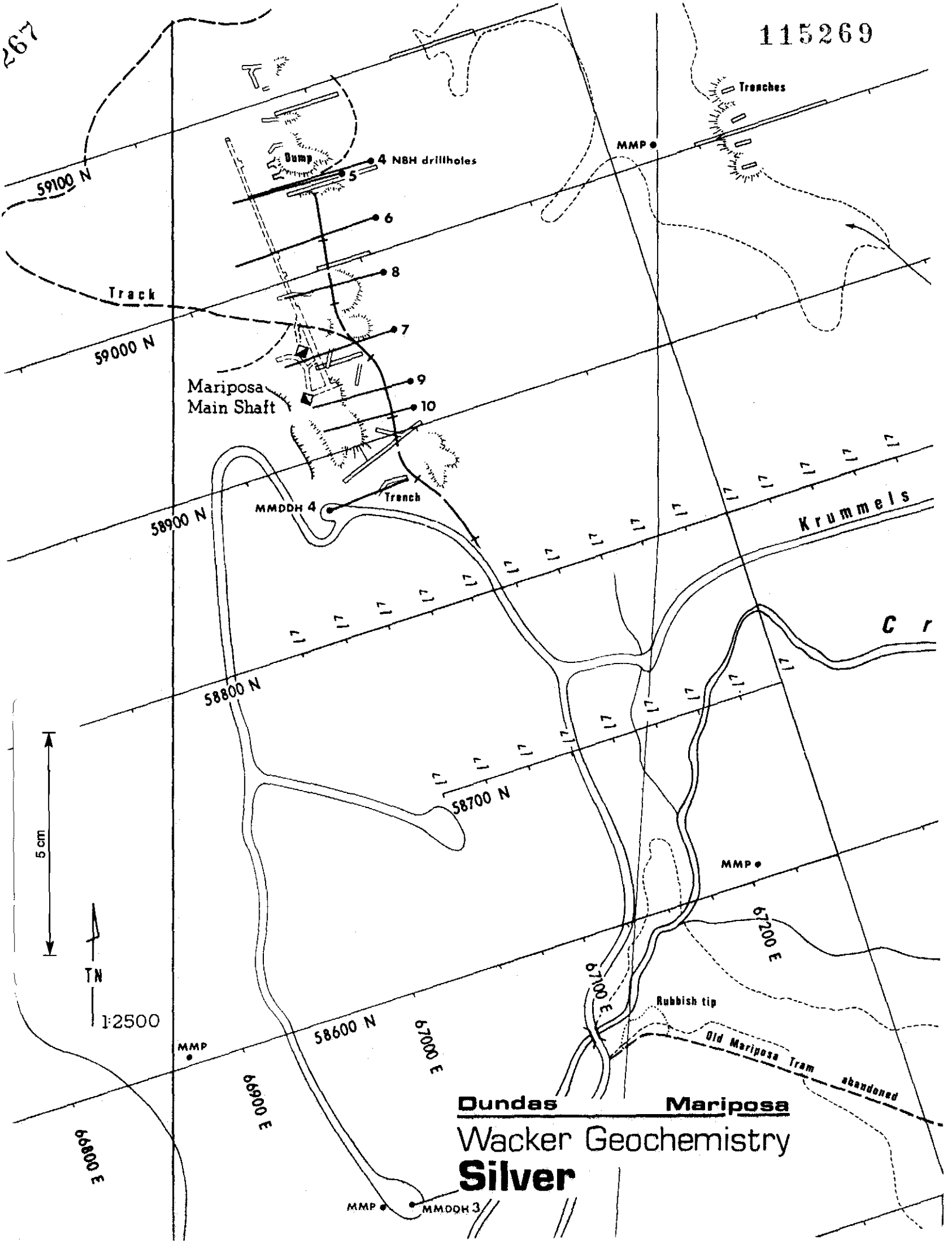
Sample Locations

115267

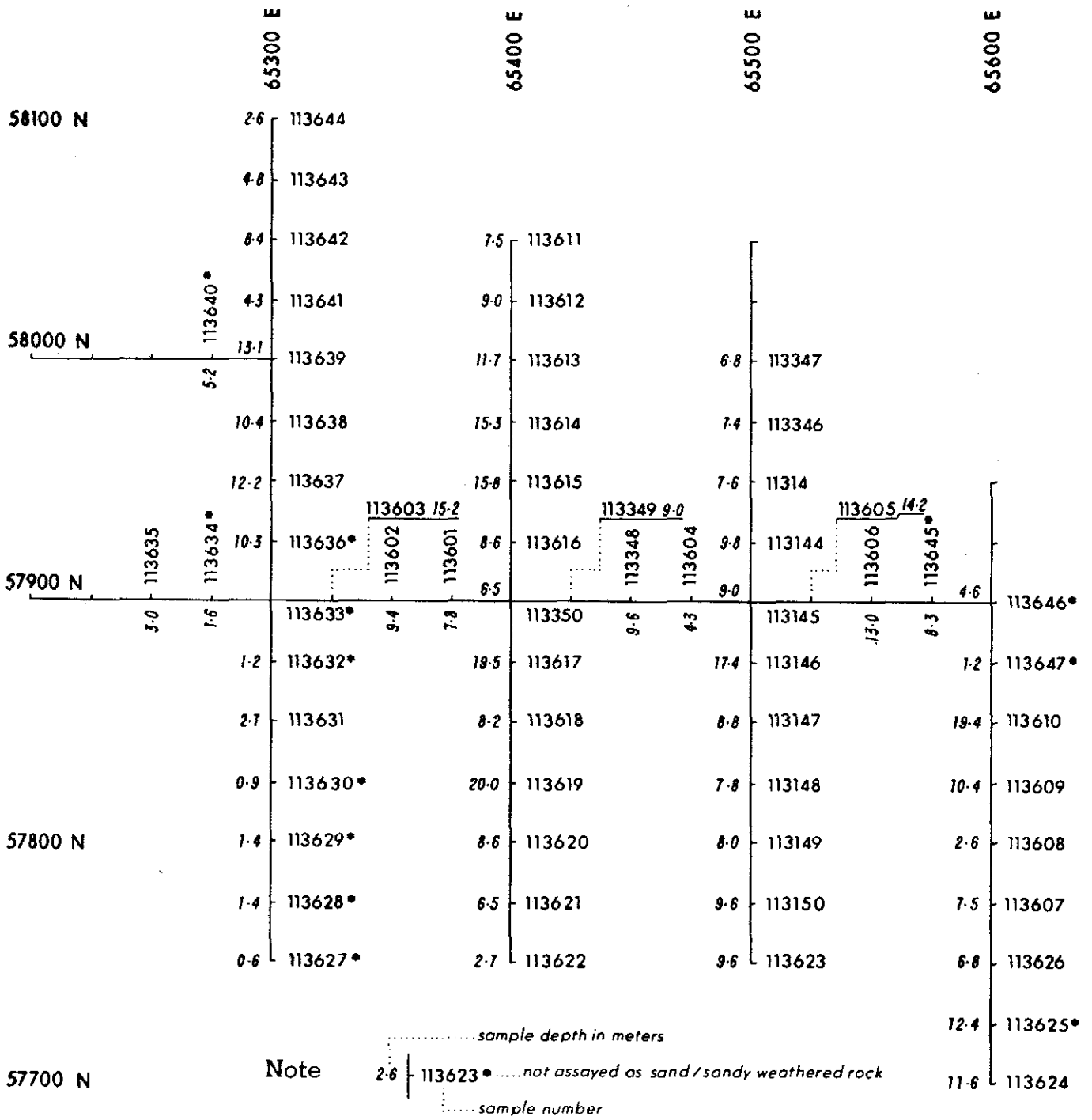

Trenches
MMP
Dump
4 NBH drillholes
5
6
8
7
9
10
Track
59100 N
59000 N
Mariposa
Main Shaft
Trench
MMDDH 4
58900 N
Krummels
58800 N
58700 N
58600 N
MMP
MMP
MMP
MMDDH 3
5 cm
TN
1:2500
67200 E
67100 E
67000 E
66900 E
66800 E
Rubbish tip
Old Mariposa Tram abandoned
Dundas Mariposa
Wacker Geochemistry
Lead


Trenches
MMP
Dump
4 N&H drillholes
5
6
8
7
9
10
Track
59100 N
59000 N
Mariposa
Main Shaft
Trench
MMDDH 4
58900 N
Krummels
58800 N
58700 N
58600 N
MMP
MMP
MMP
MMDDH 3
Rubbish tip
Old Mariposa Tram abandoned
67200 E
67100 E
67000 E
66900 E
66800 E
5 cm
TN
1:2500
Dundas Mariposa
Wacker Geochemistry
Zinc

115269


Trenches
MMP
Dump
4 NBH drillholes
5
6
8
7
9
10
Track
59100 N
59000 N
Mariposa
Main Shaft
Trench
MMDDH 4
58900 N
Krummels
58800 N
58700 N
5 cm
TN
1:2500
MMP
67200 E
67100 E
Rubbish tip
58600 N
67000 E
Old Mariposa Tram abandoned
66900 E
66800 E
MMP
MMDDH 3
Dundas Mariposa
Wacker Geochemistry
Silver

115270



Note

2·6 113623* ..... not assayed as sand / sandy weathered rock

..... sample depth in meters

..... sample number

Scale 1:2500

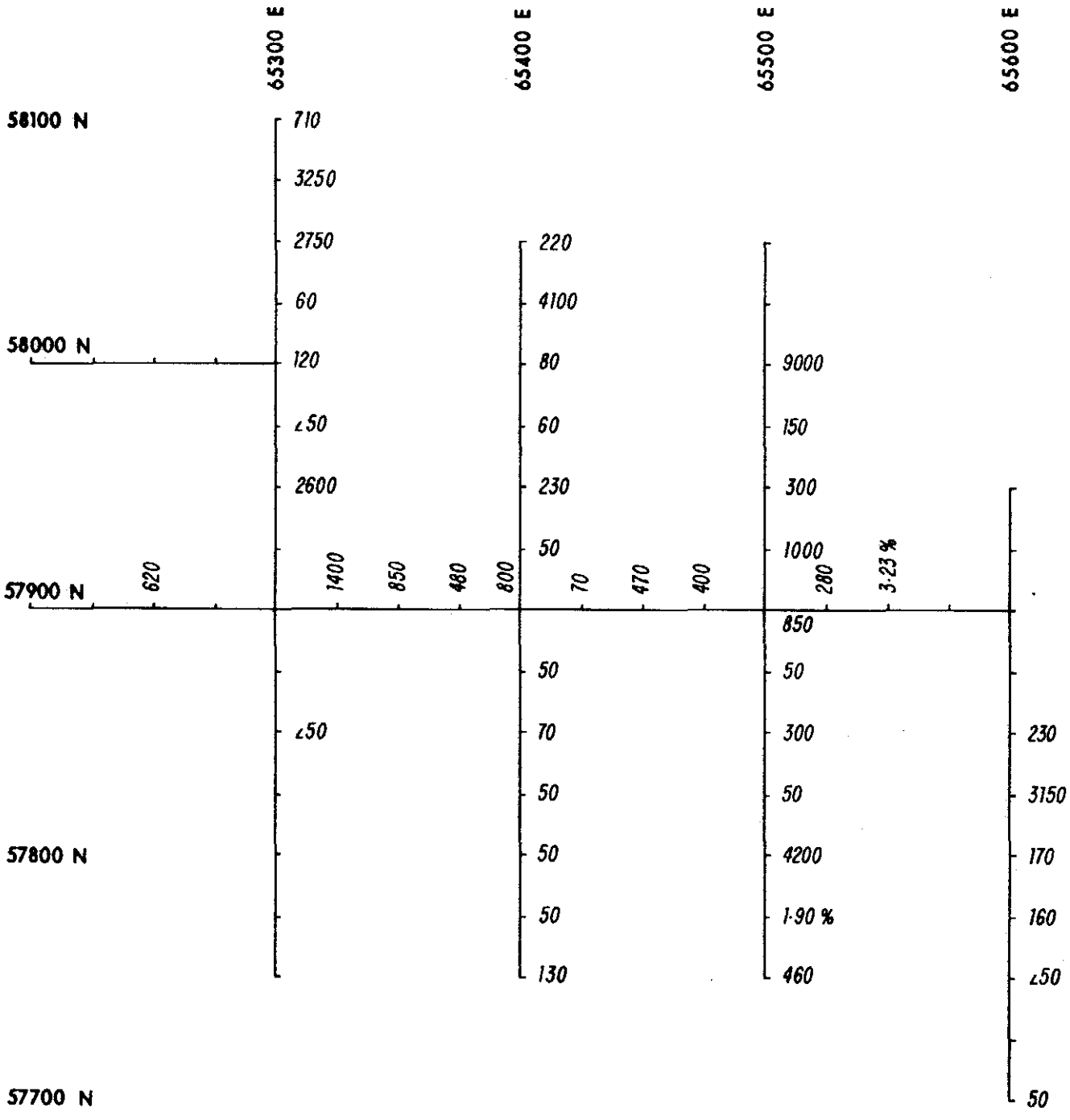
5 cm

Dundas Sunny Corner

Wacker Geochemistry

Sample Locations

115271



5 cm

Scale 1:2500

Note *Results in ppm*

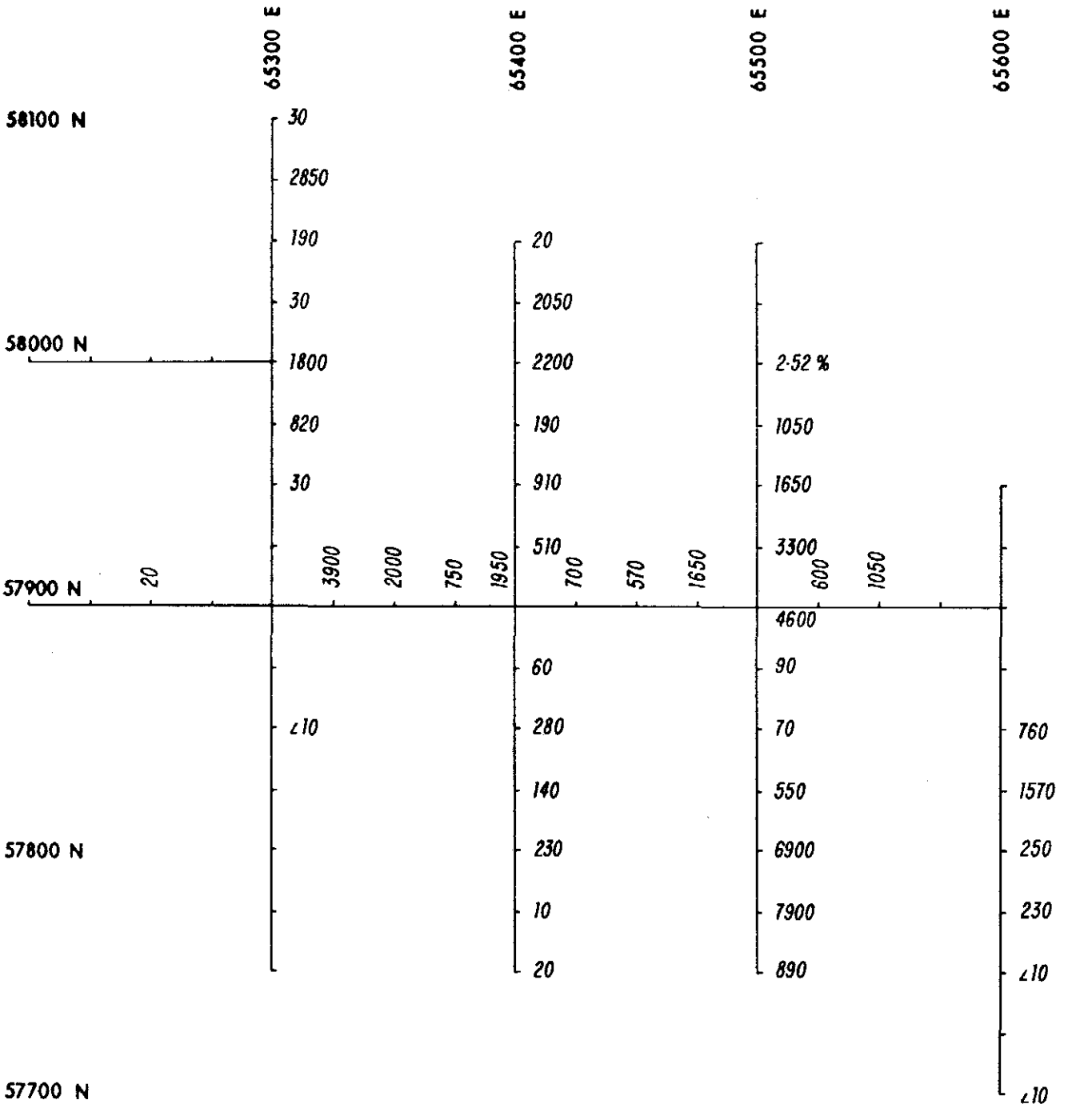
Dundas Sunny Corner

Wacker Geochemistry

Lead

270

115272



5 cm

Scale 1:2500

Note *Results in ppm*

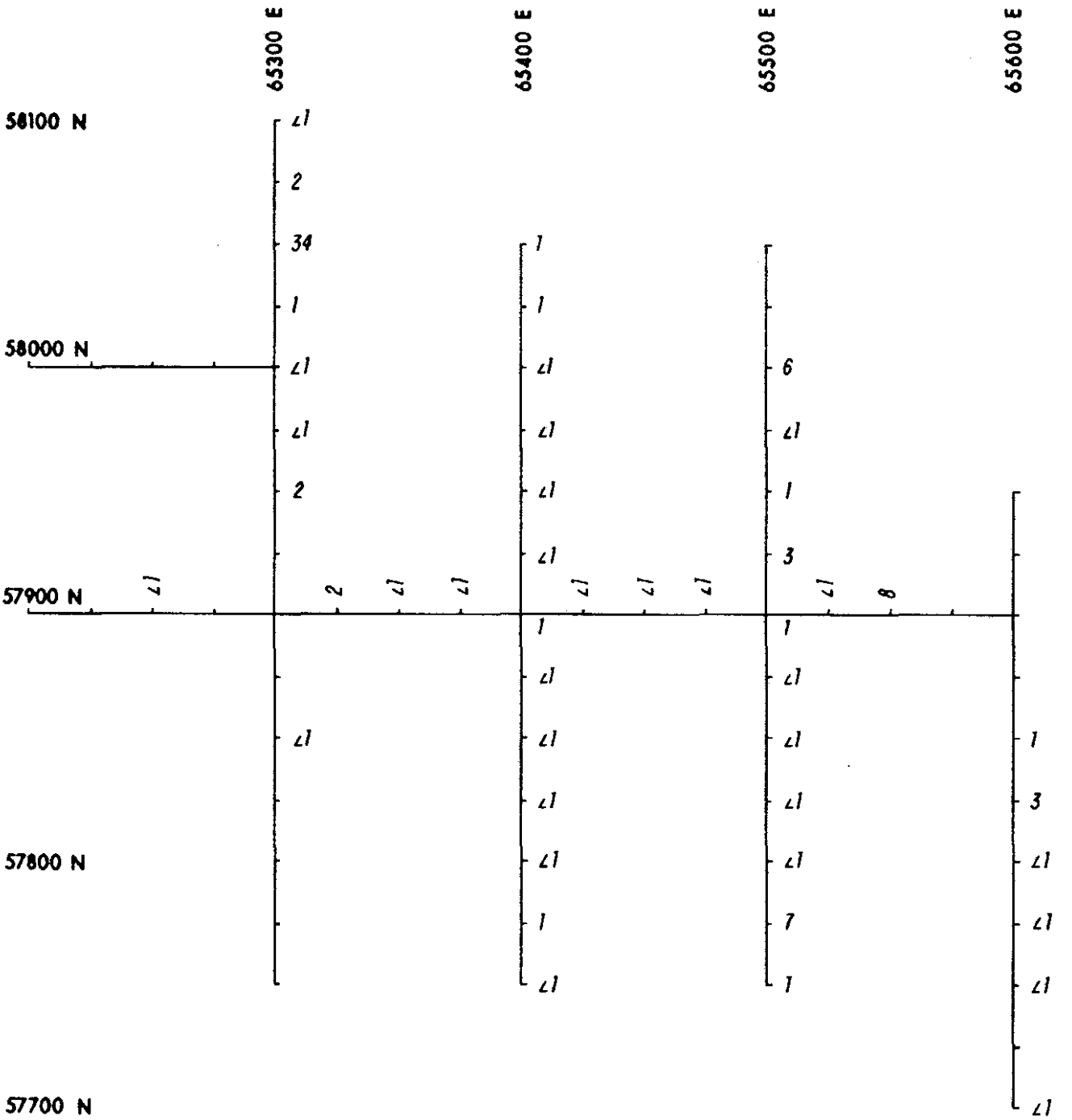
Dundas Sunny Corner

Wacker Geochemistry

Zinc

271

115273



5 cm

Scale 1:2500

Note *Results in ppm*

Dundas Sunny Corner

Wacker Geochemistry

Silver

115274

Dundas Bannockburn

Wacker Geochemistry

Sample Locations

TN

1:2500

5 cm

181° T

depth in meters

sample number

Bannockburn workings

Dump

2·9	113773	18·2	113791	10·6	113792	14·6	113911
12·2	113774	3·0	113790	10·6	113793	7·8	113910
13·6	113775	26·2	113789	26·0	113794	12·7	113909
15·0	113776	10·5	113788	16·2	113795	10·2	113908
17·1	113777	13·1	113787	12·4	113796	4·3	113907
9·4	113778	10·0	113786	8·8	113797	17·8	113912
8·2	113779	18·2	113785	24·3	113798	9·2	113906
		11·0	113784			14·9	113905
		8·2	113783			15·5	113904
		33·8	113782			3·8	113903
		10·6	113781			12·0	113902
		13·6	113980			5·7	113901
						9·0	113800
							113799

56800 N

56900 N

57000 N

57100 N

57200 N

65700 E

65800 E

65900 E

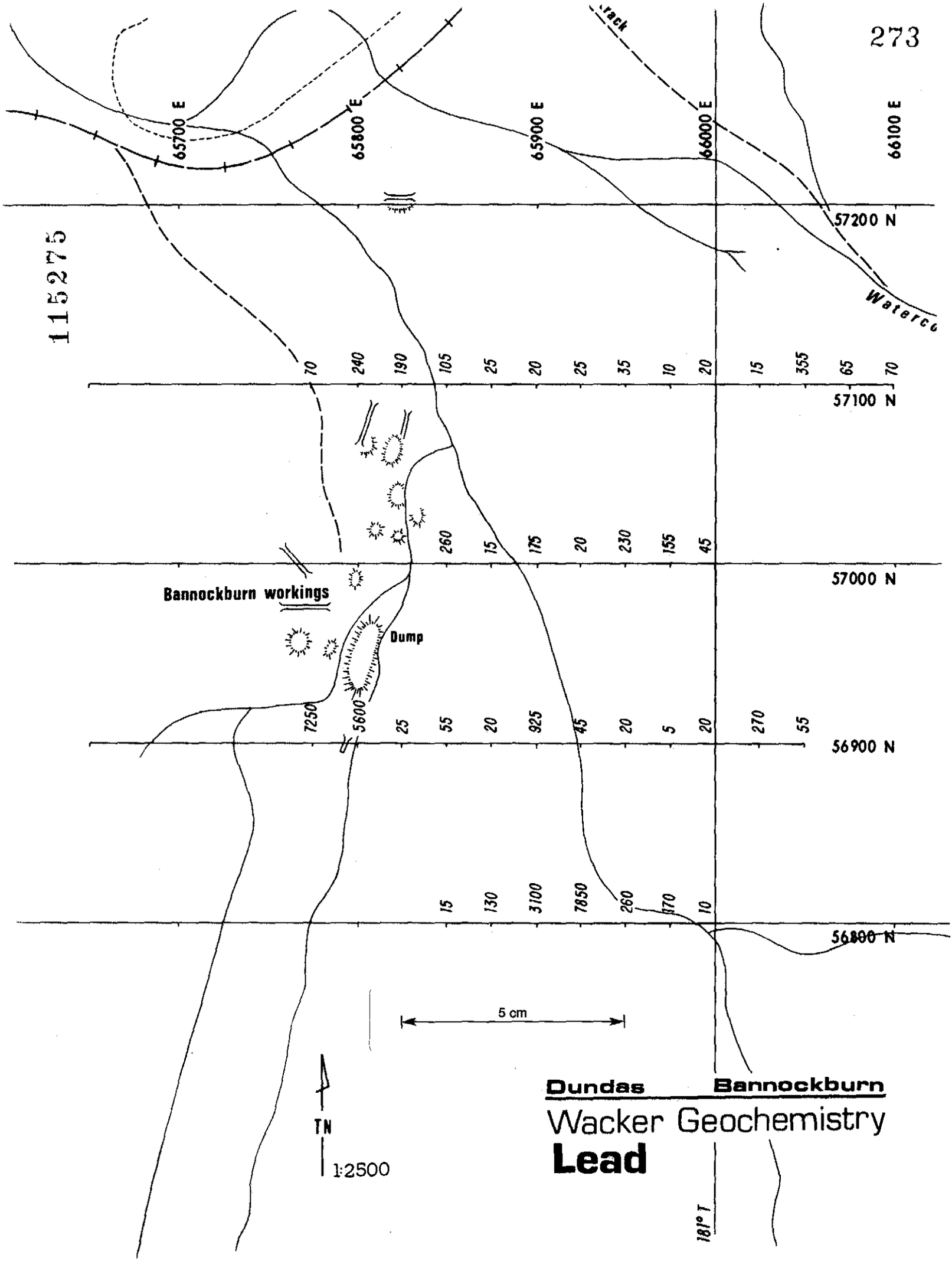
66000 E

66100 E

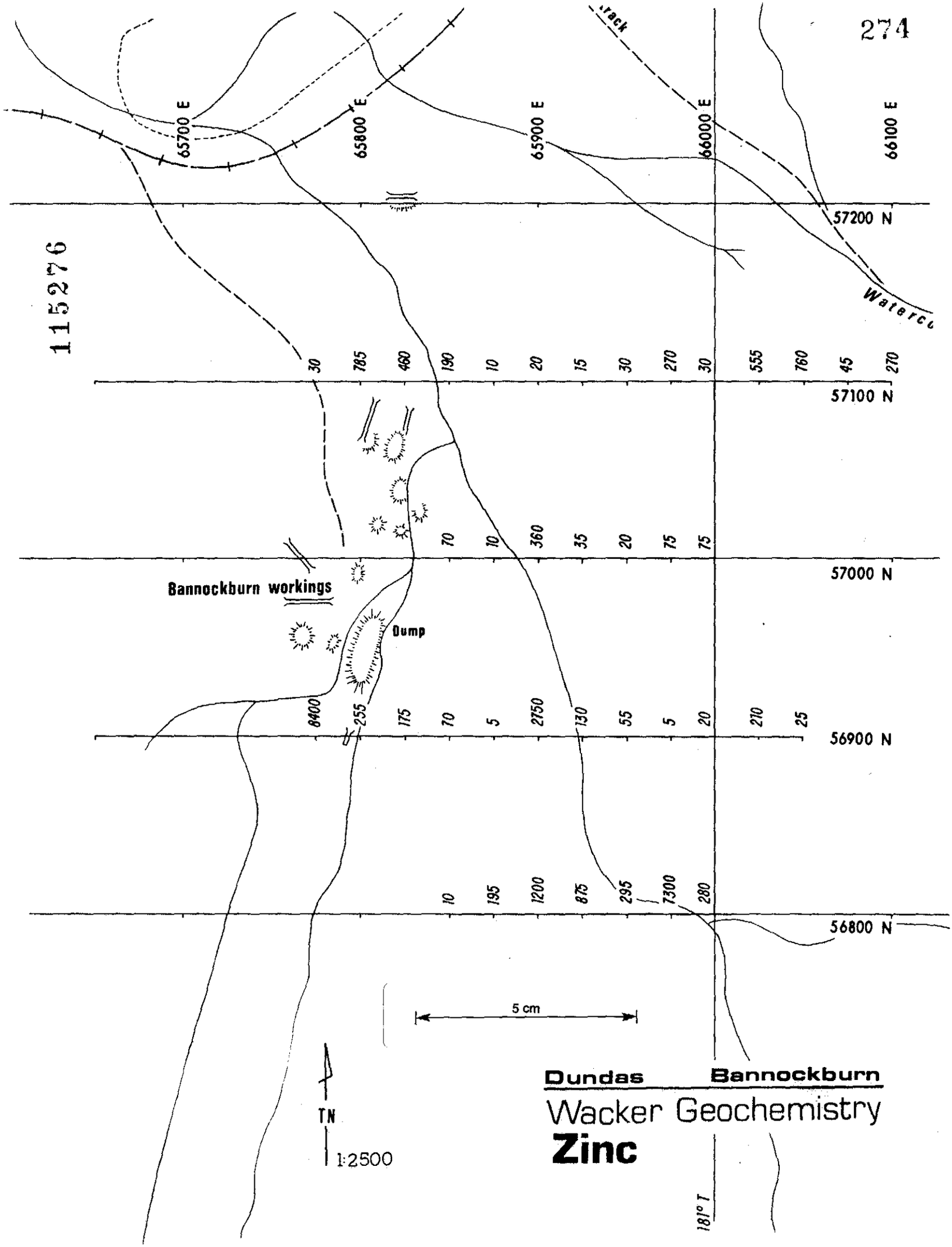
Track

Wallaroo

272


115275
65700 E
65800 E
65900 E
66000 E
66100 E
57200 N
57100 N
57000 N
56900 N
56800 N
70 240 190 105 25 20 25 35 10 20 15 355 65 70
260 15 175 20 230 155 45
7250 5600 25 55 20 925 45 20 5 20 270 55
15 130 3100 7850 260 970 10
Bannockburn workings
Dump
5 cm
TN
1:2500
181° T
Dundas Bannockburn
Wacker Geochemistry
Lead

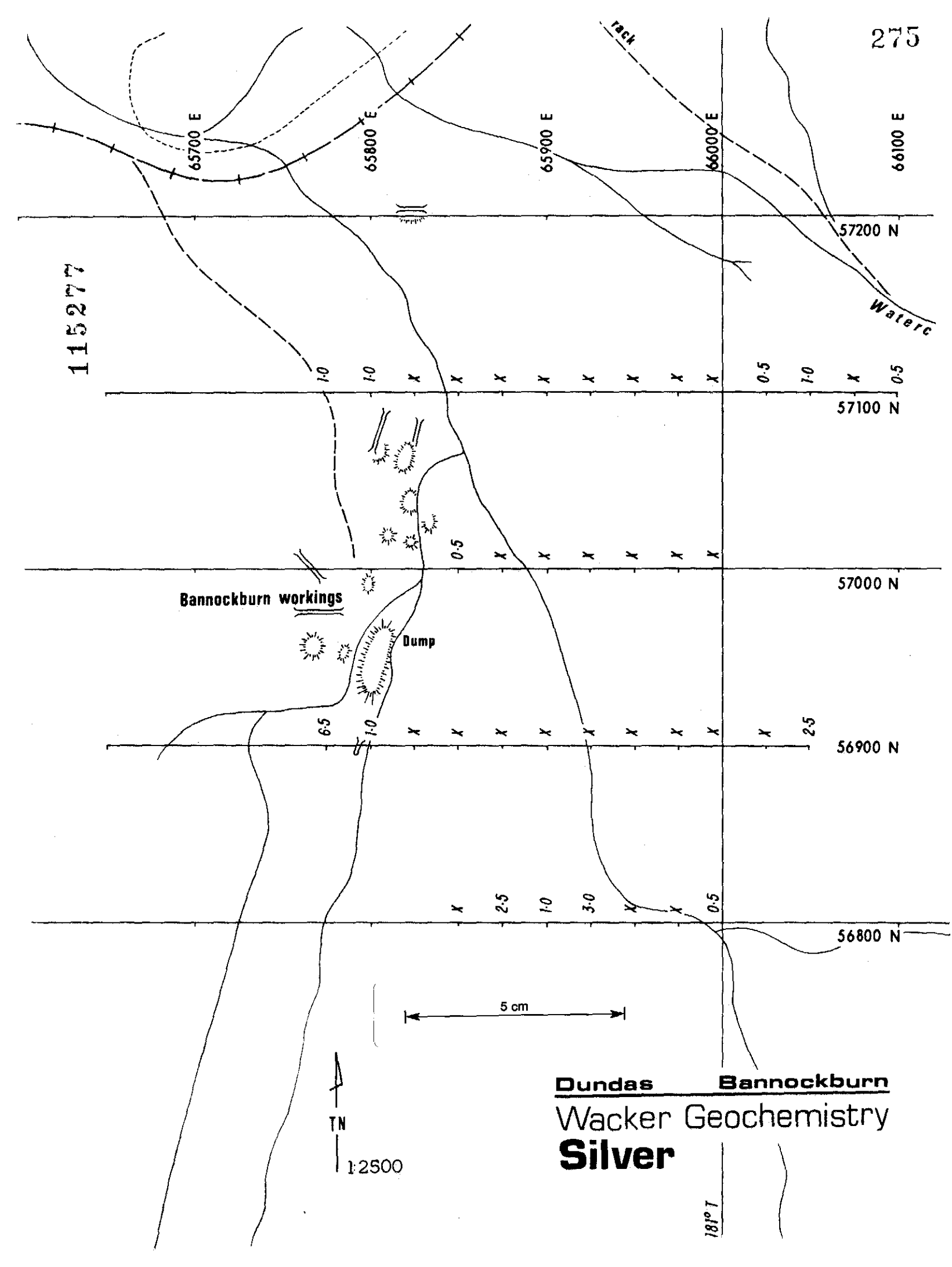
115276



Dundas Bannockburn

Wacker Geochemistry

Zinc


115277
65700 E
65800 E
65900 E
66000 E
66100 E
57200 N
57100 N
57000 N
56900 N
56800 N
Bannockburn workings
Dump
5 cm
TN
1:2500
181° T
Dundas Bannockburn
Wacker Geochemistry
Silver

276

115278

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

52 Murray Road, Welshpool, W.A. 6106

Phone (09) 458 7999

Telex AA92560

Geodex Plotted

ANALYTICAL REPORT No. 4.5 08 2993

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

Amoco Minerals Australia Coy
PO Box 949
North Sydney
N.S.W. 2060

ORDER No.	PROJECT
E 14709	A84-109

DATE RECEIVED	RESULTS REQUIRED
18.3.85	ASAP

No. OF PAGES OF RESULTS	DATE REPORTED	No. OF COPIES	TOTAL No. OF SAMPLES
		3	49

STATE OF SAMPLES		PRE-TREATMENT							ANALYSIS			
REFER BELOW	SAMPLE NUMBERS	DRY	CRUSH	SPLIT	PULVERISE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	METHOD
RC	113773-113880 113901-113912	1			2				Cu Pb Zn Ag Mn Ba		101 401

RESULTS TO

As Above
Att. Mr. B. Roxburgh

RESULTS TO

Att. Mr. Philip Jones
61 Counsel Street
Zeehan Tas 7469

Invoice to Zeehan also

REMARKS

Despatch No. 4948

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorbtion	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	Mo	spectrophotometry	SPEC
rock	Ro	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR
pulp	PU	HF mixture	A6	ignition	IG	titration	TTN
water	WA	HF under pressure	A7	pressed powder (XRF)	PP	other chemicals means	CHEM
tissue	TI	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC
stream sediment	SS					fluorescence	FLUOR
heavy mineral	HM					inductively coupled plasma	ICP

AUTHORISED OFFICER

277

115279

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

Wacker Results Bannockburn

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	4.5 08 2990	28.3.85	E.14709	1 OF 3

TUBE No.	SAMPLE No.		Cu	Pb	Zn	Ag	Mn	Ba		
1	113773		10	15	10	X	10	120		
2	113774		30	130	195	2.5	40	270		
3	113775		35	3100	1200	1.0	30	760		
4	113776		40	7850	875	3.0	5300	330		
5	113777		20	260	295	X	20	310		
6	113778		25	170	7300	X	30	330		
7	113779		15	10	280	0.5	7150	270		
8	113780		90	55	25	2.5	10	230		
9	113781		70	270	210	X	35	920		
10	113782		10	20	20	X	400	X		
11	113783		5	5	5	X	5	85		
12	113784		5	20	55	X	110	X		
13	113785		10	45	130	X	350	110		
14	113786		30	925	2750	X	30	590		
15	113787		20	20	5	X	10	370		
16	113788		20	55	70	X	40	330		
17	113789		5	25	175	X	140	X		
18	113790		30	5600	255	1.0	450	30		
19	113791		95	7250	8400	6.5	1400	190		
20	113792		25	260	70	0.5	25	490		
21	113793		10	15	10	X	115	35		
22	113794		15	175	360	X	405	200		
23	113795		10	20	35	X	145	40		
24	113796		10	230	20	X	280	25		
25	113797		45	155	75	X	15	230		

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER

278

115280

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	4.5 08 2993	28.3.85	E 14709	2 OF 3

TUBE No.	SAMPLE No.		Cu	Pb	Zn	Ag	Mn	Ba		
1	113798		10	45	75	X	140	65		
2	113799		25	70	270	0.5	30	280		
3	113800		10	65	45	X	10	120		
4	113901		25	355	760	1.0	20	210		
5	113902		25	15	555	0.5	5	290		
6	113903		10	20	30	X	225	45		
7	113904		15	10	270	X	10	140		
8	113905		10	35	30	X	140	55		
9	113906		15	25	15	X	150	130		
10	113907		5	25	10	X	135	X		
11	113908		25	105	190	X	20	510		
12	113909		25	190	460	X	40	350		
13	113910		10	240	785	1.0	1650	35		
14	113911		10	70	30	1.0	10	240		
15	113912		10	20	20	X	145	110		
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER

279

115281

ANALABS

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX	REPORT NUMBER	REPORT DATE	CLIENT ORDER No.	PAGE
	4.5 08 2993	28.3.85	E 14709	3 OF 3

TUBE No.	SAMPLE No.		Cu	Pb	Zn	Ag	Mn	Ba		
1	STD 3036		170	600	230	2.5	800	–		
2	RPT 113773		10	15	10	X	10	–		
3	RPT 113792		25	295	85	X	25	–		
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
1										
17										
18										
19										
20										
21										
22										
23	DETECTION		5	5	5	0.5	5	20		
24	DIGESTION									
25	METHOD		101	101	101	101	101	401		

Results in ppm unless otherwise specified
T = element present; but concentration too low to measure
X = element concentration is below detection limit
— = element not determined

AUTHORISED OFFICER

280

115282

The Australian
Mineral Development
Laboratories

Flemington Street, Frewville,
South Australia 5063
Phone Adelaide 79 1662
Telex AA 82520

Please address all
correspondence to
P.O. Box 114 Eastwood
SA 5063
In reply quote:

amdel

3/786/0 - AC 2990/85

8 February 1985

NATA CERTIFICATE

PART REPORT 1

Mr. Greg Kary
Amoco Minerals Australia Company
61 Counsel Street
ZEEHAN TAS 7469

REPORT AC 2990/85

YOUR REFERENCE:	Dispatch Number 4934-4935 Order Number E14473
REPORT COMPRISING:	Cover sheet Pages 1 - 5
DATE RECEIVED:	22 January 1985

D. Patterson
Chief Chemist
Analytical Chemistry Division

cc Amoco Minerals Australia Company
P.O. Box 949
NORTH SYDNEY NSW 2060

Attention: Mr. B. Roxburgh

Head Office:
Flemington Street, Frewville
South Australia 5063,
Telephone (08) 79 1662
Telex: Amdel AA82520
Pilot Plant:
Osman Place
Thebarton, S.A.
Telephone (08) 43 8053
Branch Laboratories:
Melbourne, Vic.
Telephone (03) 645 3093
Perth W A

281

115283

Report AC 2990/85

ANALYSIS

ppm

SAMPLE MARK		COPPER Cu	LEAD Pb	ZINC Zn	BARIUM Ba
6150N 67100E	133054	<10	<50	20	70
67075E	55	<10	80	180	150
67050E	56	<10	<50	40	410
67025E	57	<10	<50	60	320
67000E	58	<10	<50	60	60
66975E	59	<10	<50	<10	70
61600N 67100E	60	<10	800	2190	320
66975E	61	<10	50	<10	70
67025E	62	<10	50	50	400
67050E	63	<10	50	50	240
67075E	64	<10	<50	5500	50*
67100E	65	<10	<50	120	30
61700N 67075E	66	<10	<50	50	380
67050	67	<10	<50	20	130
67025	68	240	<50	20	70
67000E	69	<10	<50	10	110
61800N 67025E	70	<10	<50	30	100
67000E	71	<10	1650	730	380
67050	72	<10	<50	40	30
67075	73	<10	<50	230	50
67100	74	<10	<50	40	30
67125	75	<10	<50	100	500
67150	76	<10	<50	70	220
67175	77	<10	<50	1470	<20
67200	133078	<10	<50	10	20

METHOD: I2

NOTE: * sample 133064 results subject to checking

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Report 2990/85

Page 2

ANALYSIS

ppm

SAMPLE MARK		COPPER Cu	LEAD Pb	ZINC Zn	BARIUM Ba
61800N 67225	13079	<10	<50	300	20
67250	80	<10	<50	20	100
61800N 67225	81	<10	<50	70	40
67250	82	<10	540	2100	90
67200	83	<10	<50	3000	100
67175	84	80	<50	70	110
67150	85	<10	<50	60	30
67125	86	<10	<50	150	240
67100	87	<10	<50	90	70
61600N 67125	88	<10	<50	60	40
67150	89	<10	<50	40	90
67175	90	<10	<50	630	30
67200	91	<10	<50	500	20
67225	92	<10	<50	40	70
67250	93	<10	<50	210	40
61500N 67250	94	<10	<50	160	50
67225	95	<10	<50	<10	60
67200	96	<10	<50	<10	<20
67175	97	30	<50	10	<20
67150	98	<10	<50	160	30
67125	13099	<10	<50	<10	<20

METHOD: I2

115285

Report AC 2990/85

Page 1

ANALYSIS - %

SAMPLE MARK	SILICA SiO_2	TOTAL IRON as Fe_2O_3	CALCIUM OXIDE CaO	MAGNESIUM OXIDE MgO	MANGANESE OXIDE MnO
113054	14.1	1.07	37.2	6.25	0.01
55	23.4	2.42	26.3	8.30	0.02
56	66.8	2.94	0.14	1.60	<0.01
57	49.7	3.16	12.3	4.02	0.02
58	10.4	0.77	42.2	5.10	<0.01
59	93.9	0.40	<0.01	0.20	<0.01
60	62.9	2.30	<0.01	1.20	<0.01
61	95.9	0.43	<0.01	0.15	<0.01
62	58.7	3.56	4.84	4.74	0.02
63	43.4	3.06	14.5	6.85	0.02
64	6.90	3.28	39.0	6.60	0.08
65	5.90	0.70	47.7	3.82	0.01
66	45.7	3.38	12.4	4.72	0.02
67	26.5	1.18	33.7	2.30	<0.01
68	11.7	0.78	39.9	6.45	0.01
69	88.6	0.38	<0.01	0.28	<0.01
70	15.6	0.96	40.6	2.84	0.02
71	64.5	4.64	0.01	1.19	<0.01
72	10.4	1.05	46.1	3.08	0.02
73	12.2	1.25	42.4	3.74	<0.01
74	7.40	0.63	48.6	2.46	0.01
75	68.0	3.50	0.21	2.66	<0.01
76	26.5	2.22	31.6	2.44	0.03
77	1.27	0.95	51.2	3.92	0.48
78	12.4	0.56	47.3	1.54	0.01
79	7.00	1.03	46.0	4.64	0.02
80	26.9	1.28	33.1	2.26	0.01
81	10.5	1.20	41.7	5.85	0.02
82	9.15	3.24	40.7	3.68	0.12
113083	8.55	2.82	33.2	10.5	0.46

METHOD: H1/1

ANALYSIS

%

SAMPLE MARK	SILICA SiO_2	TOTAL IRON as Fe_2O_3	MANGANESE OXIDE MnO	MAGNESIUM OXIDE MgO	CALCIUM OXIDE CaO
133084	25.1	2.78	0.03	8.50	25.9
85	12.4	1.09	0.02	3.74	41.7
86	65.1	1.23	<0.01	1.82	0.99
87	9.55	1.22	0.02	5.20	40.0
88	39.3	1.19	<0.01	2.62	27.5
89	28.3	2.28	0.02	6.10	25.8
90	12.8	1.67	0.04	3.20	41.1
91	19.8	2.50	0.06	4.72	35.3
92	19.1	1.56	0.02	2.06	37.5
93	9.75	1.77	0.14	5.90	39.4
94	12.9	2.42	0.04	2.62	39.5
95	25.3	2.24	0.03	5.70	30.4
96	7.35	6.20	0.12	0.83	44.6
97	12.2	2.58	0.05	2.46	42.3
98	10.4	1.42	0.03	2.94	42.3
99	13.4	1.00	<0.01	3.54	42.1

METHOD: H/1

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Analysis code I1 | Report AC 2990/85 | Page G1

NATA Certificate | Order No. 14473 | Results in ppm

Sample		Ag
61500N 67100E	113054	<1
67075	113055	<1
67050	113056	<1
67025	113057	<1
67000	113058	<1
66975	113059	<1
61600N 67000	113060	<1
66975	113061	<1
67025	113062	<1
67050	113063	<1
67075	113064	<1
67100	113065	<1
61700N 67075	113066	<1
67050	113067	<1
67025	113068	<1
67000	113069	<1
61800 67025	113070	2
67000	113071	<1
67050	113072	<1
67075	113073	<1
67100E	113074	<1
67125E	113075	<1
67150E	113076	<1
67175E	113077	<1
67200E	113078	<1
67225E	113079	<1
67250E	113080	<1
61700N 67225E	113081	<1
67250E	113082	6
67200E	113083	2
67175E	113084	<1
67150E	113085	<1
67125E	113086	<1
67100E	113087	<1
61600N 67125	113088	<1
67150	113089	<1
67175	113090	<1
67200E	113091	<1
67225E	113092	<1
67250E	113093	<1

Detn limit (1)

86

115288

Analysis code I1 | Report AC 2990/85 | Page G2

NATA Certificate | Order No. 14473 | Results in ppm

Sample	Ag
61600N 67250 113094	<1
67225 113095	<1
67200 113096	<1
67175 113097	<1
67150 113098	<1
67125 113099	<1
Detn limit	(1)

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115289 SUNNY CORNER WACKER

The Australian Mineral Development Laboratories

Flemington Street, Frewville,
South Australia 5063
Phone Adelaide 79 1662
Telex AA 82520

Please address all correspondence to
P.O. Box 114 Eastwood
SA 5063
In reply quote:

amdel

3/786/0 - AC 2571/85

31 January 1985

NATA CERTIFICATE

AMENDED REPORT

Mr. B. Roxburgh,
Amoco Minerals Australia Company,
P.O. Box 949,
NORTH SYDNEY N.S.W. 2060

REPORT AC 2571/85

YOUR REFERENCE:	Order Number E 14452
REPORT COMPRISING:	Cover Sheet I1 - I10
DATE RECEIVED:	13 December 1985
NOTE:	Some ICP results on earlier report were not rounded off correctly. We apologise for any inconvenience this may have caused.

D. Patterson

D. Patterson
Chief Chemist
Analytical Chemistry Division

cc Mr. G. Kary,
Amoco Minerals Aust. Co.,
61 Counsel Street,
ZEEHAN TASMANIA 7469

ij

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115290

Analysis code H1 Report AC 2571/85 Page I1

NATA Certificate Results in percentages

	113143	113144	113145	113146	113147
SiO2 ✓	68.7	47.1	9.80	44.4	40.8
Fe2O3 ✓	4.48	12.4	3.62	6.50	3.54
MnO ✓	<0.010	0.09	0.05	0.19	0.04
MgO ✓	0.77	4.18	16.6	6.85	8.25
CaO ✓	0.02	5.70	24.4	11.1	13.7
BA ✓	0.035	0.020	0.007	0.025	0.025
CU	0.015	<0.001	<0.001	<0.001	<0.001
ZN	0.165	0.330	0.460	0.009	0.007
PB	0.030	0.100	0.085	0.005	0.030

Total FE as Fe2O3

289

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115291

Analysis code H1 Report AC 2571/85 Page I2

NATA Certificate Results in percentages

	113148	113149	113150	113346	113347
SiO2	67.6	72.0	86.3	63.6	68.5
Fe2O3	2.12	2.82	1.89	3.96	3.46
MnO	<0.010	<0.010	<0.010	<0.010	<0.010
MgO	1.40	1.10	0.31	0.82	0.39
CaO	0.05	0.08	0.09	<0.010	0.03
BA	0.050	0.030	0.028	0.030	0.028
CU	<0.001	<0.001	0.018	0.016	<0.001
ZN	0.055	0.690	0.790	0.105	2.52
PB	<0.005	0.420	1.90	0.015	0.90

Total FE as Fe2O3

290

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115292

Analysis code H1 Report AC 2571/85 Page I3

NATA Certificate Results in percentages

	113348	113349	113350	113601	113602
SiO2	41.6	70.4	19.9	14.9	4.42
Fe2O3	2.84	2.22	4.44	1.43	1.14
MnO	0.04	<0.010	0.09	0.02	0.04
MgO	10.3	1.47	13.4	5.00	19.4
CaO	14.8	0.06	21.1	38.3	29.1
BA	0.022	0.045	0.013	0.007	0.004
CU	<0.001	0.090	<0.001	<0.001	<0.001
ZN	0.057	0.070	0.195	0.075	0.200
PB	0.047	0.007	0.080	0.048	0.085

Total FE as Fe2O3

-91

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115293

Analysis code H1 Report AC 2571/85 Page I4

NATA Certificate Results in percentages

1 ppm = 0.0001 %

10,000 ppm = 1 %

	113603	113604	113605
SiO2	57.9	3.34	17.8
Fe2O3	3.78	2.34	2.42
MnO	<0.010	0.10	0.05
MgO	1.17	19.2	14.5
CaO	0.11	29.4	22.8
BA	0.040	0.003	0.012
CU	0.020	<0.001	0.077
ZN	0.390	0.165	0.060
PB	0.140	0.040	0.028

Total FE as Fe2O3

292

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115294

Analysis code H1 Report AC 2571/85 Page I5

NATA Certificate Results in percentages

	113606	113607	113608	113609	113610
SiO2	89.5	16.0	21.4	40.0	40.6
Fe2O3	1.30	2.90	2.18	2.52	13.2
MnO	<0.010	0.07	0.04	0.06	0.50
MgO	0.16	15.7	14.4	9.35	5.90
CaO	0.04	23.0	21.9	14.5	8.95
BA	0.005	0.008	0.009	0.020	0.016
CU	0.200	0.011	<0.001	0.027	0.009
ZN	0.105	0.023	0.025	0.157	0.076
PB	3.23	0.016	0.017	0.315	0.023

Total FE as Fe2O3

293

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115295

Analysis code H1 Report AC 2571/85 Page I6

NATA Certificate Results in percentages

	113611	113612	113613	113614	113615
SiO2	91.1	32.8	27.8	25.8	75.2
Fe2O3	2.10	46.9	39.0	5.90	2.44
MnO	<0.010	0.03	1.26	0.11	<0.010
MgO	0.27	0.47	0.73	12.2	1.34
CaO	0.04	0.04	1.46	18.9	0.33
BA	0.012	0.018	0.011	0.014	0.040
CU	0.003	0.020	0.012	0.012	<0.001
ZN	0.002	0.205	0.220	0.019	0.091
PB	0.022	0.410	0.008	0.006	0.023

Total FE as Fe2O3

294

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115296

Analysis code H1 Report AC 2571/85 Page I7

NATA Certificate Results in percentages

	113616	113617	113618	113619	113620
SiO2	74.9	22.4	12.0	7.85	65.1
Fe2O3	2.36	1.73	30.2	1.02	8.10
MnO	<0.010	0.02	0.70	0.02	0.12
MgO	1.40	5.10	1.79	2.62	0.77
CaO	0.06	33.9	19.8	48.3	0.60
BA	0.042	0.010	0.006	0.004	0.057
CU	0.007	<0.001	0.043	<0.001	0.007
ZN	0.051	0.006	0.028	0.014	0.023
PB	<0.005	<0.005	0.007	<0.005	<0.005

Total FE as Fe2O3

295

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115297

Analysis code H1 Report AC 2571/85 Page I8

NATA Certificate Results in percentages

	113621	113622	113623	113624	113626
SiO2	97.5	92.4	63.3	98.0	99.5
Fe2O3	0.87	0.77	2.60	0.66	0.28
MnO	<0.010	<0.010	<0.010	<0.010	<0.010
MgO	0.13	0.27	1.21	0.14	0.10
CaO	0.02	<0.010	0.02	<0.010	<0.010
BA	0.005	0.015	0.059	0.006	0.004
CU	0.009	<0.001	0.011	<0.001	<0.001
ZN	<0.001	0.002	0.089	<0.001	<0.001
PB	<0.005	0.013	0.460	0.005	<0.005

Total FE as Fe2O3

296

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115298

Analysis code H1 Report AC 2571/85 Page I9

NATA Certificate Results in percentages

	113631	113635	113637	113638	113639
SiO2	102.6	92.9	73.4	67.7	36.9
Fe2O3	0.24	0.48	2.24	4.16	24.5
MnO	<0.010	<0.010	<0.010	<0.010	0.50
MgO	0.04	0.37	0.78	1.42	3.76
CaO	<0.010	0.03	<0.010	0.03	4.78
BA	<0.002	0.023	0.027	0.033	0.016
CU	0.004	<0.001	0.068	0.008	0.030
ZN	<0.001	0.002	0.003	0.082	0.180
PB	<0.005	0.062	0.260	<0.005	0.012

Total FE as Fe2O3

297

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115299

Analysis code H1 Report AC 2571/85 Page I10

NATA Certificate Results in percentages

	113641	113642	113643	113644
SiO2	95.4	78.5	66.6	94.0
Fe2O3	0.40	0.36	2.36	0.50
MnO	<0.010	<0.010	<0.010	<0.010
MgO	0.21	0.82	1.17	0.30
CaO	0.01	0.05	<0.010	<0.010
BA	0.008	0.031	0.050	0.014
CU	0.005	0.027	0.005	0.027
ZN	0.003	0.019	0.285	0.003
PB	0.006	0.275	0.325	0.071

Total FE as Fe2O3

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115300

Analysis code A1/2 Report AC 2571/85 Page G1

NATA Certificate Results in ppm

	Sample	Ag
Sunny Corner E / Nth		
65500 / 57950	113143	1
57925	113144	3
57900	113145	1
57875	113146	<1
57850	113147	<1
57825	113148	<1
57800	113149	<1
57775	113150	7
65500 / 57975	113346	<1
65500E / 58000N	113347	6
65450E / 57900N	113348	<1
65475E / 57900N	113349	<1
65400E 57900N	113350	1
65375E 57900N	113601	<1
65350E 57900N	113602	<1
65325E "	113603	2
65475 "	113604	<1
65525 "	113605	<1
65550 "	113606	8
65600E 57775N	113607	<1
65600E 57800N	113608	<1
" 57825N	113609	3
" 57850	113610	1
65400E 58050N	113611	1
" 58025N	113612	1
" 58000N	113613	<1
" 57975N	113614	<1
" 57950N	113615	<1
" 57925N	113616	<1
" 57875N	113617	<1
" 57850N	113618	<1
" 57825N	113619	<1
" 57800N	113620	<1
" 57775N	113621	1
" 57750N	113622	<1
65500E 57750N	113623	1
65600E 57700N	113624	<1
65600E 57750N	113626	<1
65300E 57850N	113631	<1
65250E 57900N	113635	<1

Detn limit (1)

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115301

Analysis code A1/2 Report AC 2571/85 Page G2

NATA Certificate Results in ppm

113636 65300E 57925N

Sunny Corner

		Sample	Ag
65300E	57950N	113637	2
"	57975N	113638	<1
"	58000N	113639	<1
"	58025N	113640	1
"	58050N	113642	34
"	58075N	113643	2
"	58100N	113644	<1
		Detn limit	(1)

113645-46
57900N 65575E
" 65600E

57875N 113647
65600E

300

115302

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

Head Office and Central Laboratory
305 SOUTH ROAD,
MILE END SOUTH
STH. AUST. 5031
TEL.: (08) 43 5722
TELEX: AA89323

Wacker Plotted.

NATA REGISTERED No. 1526

OUR REF.: COM 841771

YOUR REF.: Des. No. 4922 O/N 13302

Mr. J. Suppree,
Amoco Minerals Aust. Co.,
61 Counsel Street,
ZEEHAN TAS 7469,

22.8.84

Dear Johnathan,

RE: JOB COM 841771

Enclosed are the assays for the samples delivered to our laboratory on the 15th August 1984.

Yours sincerely,
COMLABS PTY LTD

per :

c.c.: Mr. B. Roxburgh

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115303

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ANALYTICAL REPORT

JOB COM841771
O/N : 4922

	SAMPLE	Cu	Pb	Zn	Ag	Mn	Ba		
	112154	20	640	3450	2	36	230	DTBJ-84-1,	3-4m
	112155	18	530	2750	1	36	270	"	4-5m
	112156	26	620	6900	2	36	350	"	5-6m
	112157	24	740	4850	2	30	320	"	6-7m
	112158	22	1450	7250	5	40	520	"	7-8m
	112159	28	2950	1.35%	4	34	370	"	8-9m
	112160	20	280	2700	1	38	250	"	9-10m
	112161	22	1250	4200	5	28	420	"	10-11m
	112162	24	1750	6600	4	26	380	"	11-12m
	112163	24	1250	4300	2	24	350	"	12-13m
	112164	22	165	720	1	20	310	"	13-14m
	112165	16	290	2250	1	26	410	"	14-15m
	112166	16	125	1850	1	28	400	"	15-16m
2m Split	112167	10	380	5350	2	30	105	"	16-18m
	112168	10	600	9250	2	44	85	"	18-19m
	112169	14	750	4800	2	40	115	"	19-20m
	112170	7	90	95	2	410	85	"	61-62m
	112171	8	80	320	2	620	70	"	62-63m
2m Split.	112172	7	55	100	1	410	90	"	63-65m
	112173	7	60	125	2	220	100	"	65-66m
	112174	7	70	410	2	300	50	"	66-67m
	112175	8	210	730	2	950	145	"	59-60m
	112176	7	80	100	2	430	75	"	? 60-61m?
	112177	18	3450	360	3	10	200	DTSC-84-3,	6-7m
	112178	100	7300	1050	12	8	260	"	7-8m
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm		
	METH	AAS	AAS	AAS	AAS7	AAS3	XRF		

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115304

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ANALYTICAL REPORT

JOB COM841771
O/N : 4922

	SAMPLE	Cu	Pb	Zn	Ag	Mn	Ba		
2m Split	112179	28	4250	5300	7	20	410	DTSC-84-3 ,	16-18m
	112180	22	6550	2100	6	18	310	"	18-19m
	112181	28	8450	4450	7	18	460	"	19-20m
2m Split.	112182	34	570	860	2	8	720	"	20-22m
	112183	28	460	1650	2	6	570	"	22-23m
	112184	44	3200	4800	4	16	600	"	23-24m
	112185	34	1500	1000	4	14	800	"	24-25m
	112186	30	2400	340	3	130	590	"	25-26m
	112187	24	1250	650	2	1100	660	"	26-27m
	112188	22	2000	990	3	700	620	"	27-28m
5m Split	112189	16	2150	4050	3	1.55%	250	"	28-33m
	112190	38	2.70%	2600	24	400	760	"	33-34m
2m Split.	112191	44	2550	1300	4	28	220	"	38-40m
	112192	22	1800	600	2	16	145	"	40-41m
	112193	16	2000	300	2	14	125	"	41-42m
2m Split	112194	16	1500	190	1	14	90	"	42-44m
2m Split.	112195	32	1100	430	5	38	155	"	44-46m
2m Split.	112196	38	7950	2750	12	1500	440	"	46-48m
	112197	32	8200	2900	12	4100	400	"	48-49m
	112198	18	710	430	2	1000	105	"	49-50m
	112199	28	600	360	30	1500	155	"	50-51m
	112200	20	730	390	20	1500	140	"	51-52m
3m Split	113151	70	2.10%	6200	12	2750	650	DTSC-84-3	52-55m
2m Split.	113152	65	3.70%	3200	3	220	650	"	55-57m
	113153	46	2.05%	4150	3	1.15%	370	"	57-58m
	UNITS	ppm	ppm	ppm	ppm	ppm	ppm		
	SCHEME	AAS1	AAS1	AAS1	AAS3	AAS2	XRF1		

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115305

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ANALYTICAL REPORT

JOB COM841771
O/N : 4922

SAMPLE	Cu	Pb	Zn	Ag	Mn	Ba	
113154	36	1.04%	5650	18	1.10%	570	DTSC-84-3, 58-59m
113155	34	3050	560	80	820	550	" 59-60m
113156	60	8750	320	60	38	570	" 60-61m
113157	1000	3.85%	500	3	42	580	" 61-62m
113158	310	1.83%	460	48	32	540	" 62-63m
113159	180	1.78%	140	55	18	580	" 63-64m
113160	10	930	2700	26	2.10%	115	5945ON ~ 67290E (MARIPOSA).
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	
SCHEME	AAS1	AAS1 AAS1A	AAS1	AAS3	AAS2 AAS2A	XRF1	

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304

115306

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ANALYTICAL REPORT

JOB COM841771
O/N : 4922

SAMPLE	Cu	Pb	Zn	Ag	Ba		
103184	30	155	730	1	270	BLACKJACKS	61300N 67165E
103185	20	65	26	2	125	"	61300N 67140E
103186	20	26	42	1	330	"	61200N 67050E
103187	8	16	18	<1	<10	"	61200N 67025E
103188	6	10	8	<1	25	"	61200N 67000E
103189	7	6	6	<1	20	"	61300N 66950E
103190	4	30	55	1	20	"	61300N 66975E
103191	7	32	20	2	75	"	61300N 67000E
103192	14	26	3750	1	360	"	61300N 67025E
103193	16	30	105	<1	390	"	61300N 67050E
103194	9	26	48	2	75	"	61300N 67075E
103195	5	34	38	2	30	"	61300N 67100E
103196	10	40	210	1	45	"	61300N 67125E
103197	10	600	2350	2	75	"	61400N 67150E
103198	18	550	1100	2	95	"	61400N 67125E
103199	14	135	380	1	110	"	61400N 67100E
103200	20	140	870	1	460	"	61400N 67075E
113101	18	75	155	1	410	BLACKJACKS	61400N 67050E
113102	20	20	145	1	310	"	61400N 67025E
113103	20	940	3600	2	300	"	61400N 67000E
113104	24	930	7700	1	90	"	61400N 66975E
113105	8	42	115	2	60	"	61400N 67175E
113106	18	48	155	2	175	"	61400N 67200E
113107	14	32	110	2	110	"	61400N 67225E
113108	20	34	100	1	320	"	61400N 67250E
UNITS	ppm	ppm	ppm	ppm	ppm		

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115307

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ANALYTICAL REPORT

JOB COM841771
O/N : 4922

	SAMPLE	Cu	Pb	Zn	Ag	Ba	
	113109	14	540	7000	1	450	BLACKJACKS 60800N 67330E
DEPTH 2m.	113110	26	195	3150	1	350	" 60800N 67310E
" 4m.	113111	16	110	300	1	440	" 60800N 67310E
" 6m	113112	20	580	2100	2	410	" 60800N 67310E
" 8m	113113	20	160	590	1	390	" 60800N 67310E
" 10m.	113114	18	145	730	1	350	" 60800N 67310E
" 13m	113115	20	95	350	1	440	" 60800N 67310E
" 16m	113116	22	200	670	1	480	" 60800N 67310E
" 19m	113117	28	1500	1.60%	4	530	" 60800N 67310E
" 20.5m	113118	18	155	730	2	500	" 60800N 67310E
	UNITS	ppm	ppm	ppm	ppm	ppm	
	SCHEME	AAS1	AAS1	AAS1 AAS1A	AAS3	XRF1	

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115308

COMLABS Pty. Ltd.
COMPUTERISED ANALYTICAL LABORATORIES

Head Office and
Central Laboratory
305 SOUTH ROAD,
MILE END SOUTH
STH. AUST. 5031
TEL.: (08) 43 5722
TELEX: AA89323

NATA REGISTERED No. 1526

OUR REF.: 841634

YOUR REF.: 4920

Mr. J. Suppree,
Amoco Minerals Australia Company,
61 Counsel Street,
Zeehan Tas 7469,

6th August, 1984

Dear Johnathon,

RE: JOB COM 841634

Enclosed are the assays for the samples delivered to our laboratory on the 30th July, 1984.

Yours sincerely,
COMLABS PTY LTD

per :

c.c.: Mr. B. Rosburgh

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115309

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ANALYTICAL REPORT

JOB COM841634 O/N : 12094 Despatch No.4920

Results in ppm

SAMPLE	Cu	Pb	Zn	Ag	Ba	
						Black Jacks L 61200N
102901	36	36	130	<1	240	67175E
102902	22	115	440	<1	190	67200E
102903	20	70	260	<1	260	67225E
102904	20	4100	2400	<1	175	67250E
						L 61300N
102905	38	90	120	<1	280	67250E
102906	24	60	70	<1	340	67225E
102907	12	26	165	<1	65	67200E
102908	12	44	650	<1	135	67175E
						Mariposa L 58800N
102909	10	24	20	<1	105	67200E
102910	10	12	18	<1	10	67225E
102911	26	20	32	<1	80	67250E
102912	12	38	70	<1	30	67275E
102913	12	30	1800	<1	70	67300E
102914	8	70	1200	<1	35	67325E
102915	80	60	30	<1	280	67350E
102916	16	20	22	<1	40	67175E
102917	10	135	50	<1	40	67150E
102918	16	65	90	<1	140	67125E
102919	16	<4	10	<1	10	67100E
102920	14	<4	10	<1	10	67075E
102921	8	<4	6	<1	60	67050E
102922	10	24	8	<1	360	67025E
102923	8	32	6	<1	340	67000E
						L 59500N ✓
102924	10	32	970	<1	380	67250E
102925	10	70	940	<1	120	67225E

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115310

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ANALYTICAL REPORT

JOB COM841634 O/N : 12094 Despatch No.4920

Results in ppm

SAMPLE	Cu	Pb	Zn	Ag	Ba	
						Mareposa L 59500N
102926	28	550	1400	<1	290	67200E
102927	10	14	10	<1	65	67175E
102928	6	20	6	<1	290	67150E
102929	8	10	6	<1	75	67125E
102930	6	14	2	<1	85	67100E
102931	14	70	260	<1	100	67275E
102932	14	44	65	<1	100	67300E
102933	14	90	80	<1	280	67325E
102934	16	36	95	<1	270	67350E
102935	24	320	1500	<1	105	67350E L59600N
102936	12	95	510	<1	40	67325E
102937	36	180	150	3	210	67300E
102938	20	130	380	<1	60	67275E
102939	26	60	50	<1	280	67375E
102940	130	26	65	<1	290	67400E
102941	14	55	105	<1	90	67250E
102942	28	290	660	<1	340	67225E
102943	24	6600	7500	5	480	67200E
102944	12	1.13%	3400	5	75	67175E
102945	10	490	50	<1	80	67150E
102946	6	20	2	<1	65	67125E
102947	6	14	<2	<1	60	67100E
102948	6	30	4	<1	145	67050E L59700N
102949	12	6	6	<1	35	67075E
102950	155	1200	850	5	400	67100E

309

115311

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ANALYTICAL REPORT

JOB COM841634 O/N : 12094 Despatch No.4920

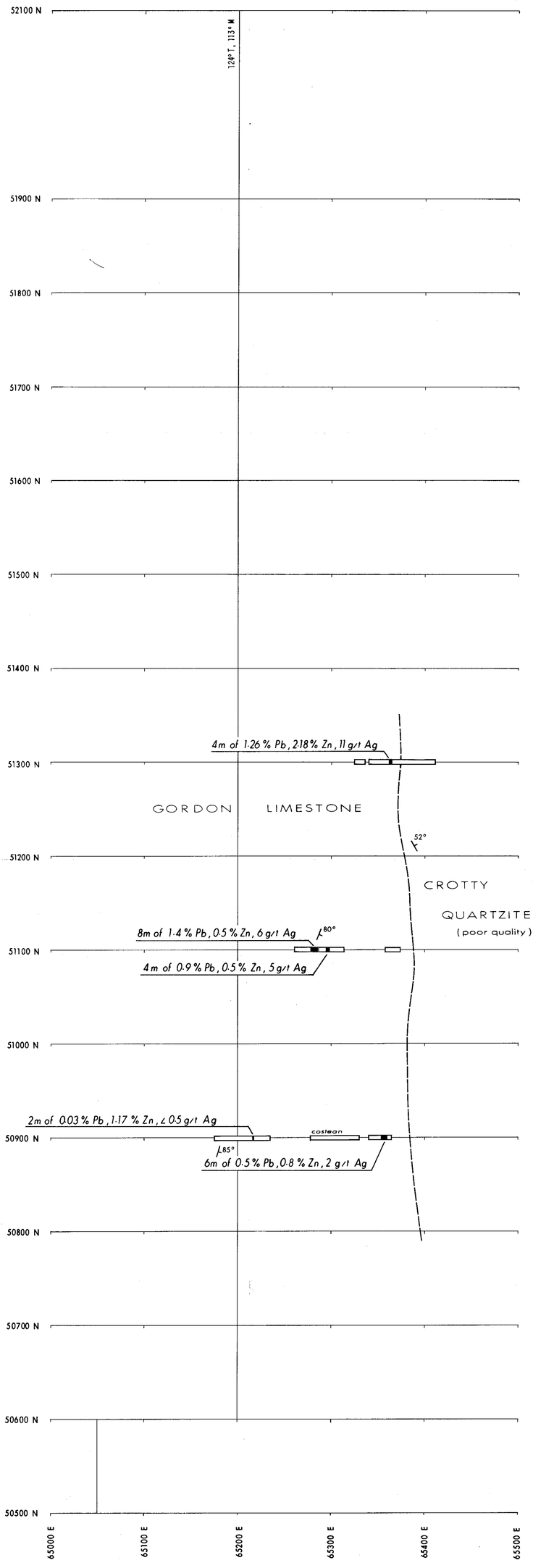
Results in ppm

SAMPLE	Cu	Pb	Zn	Ag	Ba	
						Mariposa L 59700N
102988	6	550	60	<1	140	67125E
102989	32	300	170	<1	380	67150E
102990	10	24	22	<1	115	67175E
102991	6	130	160	<1	75	67200E
102992	12	26	390	<1	80	67225E
102993	10	14	30	<1	80	67250E
102994	8	70	250	<1	85	67275E
102995	24	650	3600	<1	175	67300E
102996	10	42	220	<1	130	67325E
102997	14	60	480	<1	105	67350E
102998	8	80	210	<1	25	67375E
102999	20	110	370	<1	250	67400E
						L 58700N
103000	16	160	840	<1	100	67250E
103172	10	85	720	<1	50	67225E
103173	32	60	60	<1	20	67200E
103174	16	400	1500	<1	340	67175E
103175	20	110	500	<1	100	67150E
103176	14	70	8	<1	60	67125E
103177	60	550	1050	<1	300	67100E
103178	12	<4	6	<1	10	67075E
103179	10	14	16	<1	110	67050E
						Black Jacks L 61200N
103180	60	810	910	6	220	67150E
103181	22	60	280	<1	260	67125E
103182	20	520	30	<1	450	67100E
103183	22	300	38	<1	310	67075E

115312

APPENDIX 7

PROFESSOR GRID - COSTEAN PROFILES



5 cm

Dundas Professor Grid

Costean Location and

Mineralization

Scale 1:2500

115313

312

Amoco Minerals Australia Company

5 cm

115514

costean profile

Project C.S.R. J.V. **No** A84-109	**Commenced** MAY 22 1984
Prospect Professor	**Completed** MAY 22 1984
Coordinates: **Line** 50900N	**Logged by** G. Kary
65234E **to** 65174E	**Sample length** 2m
Total length 60m	**Scale** 1:200 1cm = 2m

Py - pyrite

Assays Cu	Pb	Zn	Ag	Ba		Graphic geology (5m)	Meterage	Geologic description
25	65	105	X	344		←		SILTY LIMESTONE ? - Dark grey silty clay, minor breccia
20	35	155	X	393		←	65230E	BRECCIA - Black and grey fragments in a dark grey matrix. Quite
20	50	120	X	387				silty. Trace pyrite
20	75	190	X	457		←		LIMESTONE ? - Dark grey clay, slightly bedded
25	30	140	X	544				
20	735	1050	X	518				
25	85	590	X	538		← Py	65220E	BRECCIA - Black and grey fragments in a dark grey matrix. Minor pyrite
45	115	3100	X	712		← Py		CALCAREOUS SILTSTONE - Grey, fine grained, 1-2% pyrite
70	325	1.17%	X	663		← Py		LIMESTONE - Grey, fine grained, minor calcite veining. Variably
15	95	420	X	83				weathered to clay. Up to 5% pyrite
15	105	530	X	83				
40	505	2100	X	254			65210E	
30	250	1900	X	461				
30	110	6100	X	441				
45	255	8200	X	469				
30	115	2850	X	383		←		SILICIFIED LIMESTONE - Grey fine grained, minor clay
30	190	7700	X	409			65200E	
20	235	1550	X	216		←		MUD - Black, sloppy, overlying smooth hard probable limestone.
10	35	255	X	125				Very poor samples.
25	55	305	X	352				
25	110	285	X	259				
20	75	400	X	292			65190E	
20	55	135	X	236		?-?		
10	20	35	X	169		←		LIMESTONE - Grey, micritic, minor fine laminations. Bedding
15	55	125	X	167				@ 140°/85°N
15	25	165	X	152				
20	30	220	X	269			65180E	
20	40	440	X	310				LIMESTONE - Dark grey, fine grained, moderate carbonaceous lamina.
10	15	85	X	177				Minor silicified zones
20	30	75	X	299				
							65170E	

Assays in ppm unless noted otherwise

Costean Line 50900N

313

Amoco Minerals Australia Company

5 cm

costean profile

Project C.S.R. J.V. **No** A84-109	**Commenced** MAY 21 1984
Prospect Professor	**Completed** MAY 21 1984
Coordinates: **Line** 50900N	**Logged by** G.Kary
65364E **to** 65276E	**Sample length** 2 m
Total length 88 m	**Scale** 1:200 1cm = 2m

Assays						Graphic geology	Meterage	Geologic description
Cu	Pb	Zn	Ag	Ba		5m		Gn - galena Py - pyrite
5	40	15	0.5	249				OVERBURDEN - Brown sand and pale green clay
30	485	855	1.0	497			Gn, Py 65360E	LIMESTONE ? - Dark grey clay, minor quartz fragments. Trace galena, pyrite
25	5550	9800	2.5	459			Gn, Py	, minor contamination by overburden.
25	3000	5650	2.5	451			Gn, Py	
30	5550	8700	3.0	551			Gn, Py	
35	1850	6500	1.5	470			Gn, Py	
20	1050	8500	2.0	295			Gn, Py 65350E	
20	805	4200	1.0	192			Gn, Py	
10	1550	3300	1.0	89				LIMESTONE - Dark grey, fine grained, highly fractured, minor fossils
5	630	1700	0.5	69				
5	310	1250	X	52				DOLOMITE - Black, finely crystalline, minor calcite veinlets. Variably fractured
5	285	3550	X	44			65340E 65330E	(65340E to 65330E missed because of creek)
10	785	1050	X	99				DOLOMITE - Grey, finely crystalline, variably weathered to grey
5	460	755	X	45				sandy clay. Minor fracturing. Rare sphalerite along
10	505	1250	X	50				fracture planes in quartz carbonate veins
10	655	925	0.5	64				
5	230	305	X	99			65320E	
5	170	345	X	62				
5	155	185	X	47			Sp	
5	125	290	X	65				
5	240	700	X	25			Gn, Py	
5	150	725	X	42			Py 65310E	
10	45	380	X	122				DOLOMITE - Dark grey, minor circular fossil shapes, fine to
20	365	485	1.0	418				medium crystalline. Minor carbonate veining
20	195	260	0.5	265				
10	95	190	X	159				
25	185	255	0.5	199			65300E	
30	405	320	0.5	347				
185	130	210	X	154				
15	100	265	X	150				
15	145	215	X	202				
20	315	435	0.5	372			65290E	
10	45	210	X	118				
10	80	135	X	223				
40	870	390	1.0	672				
20	385	295	0.5	466				
25	365	210	1.0	659			65280E	DOLOMITE ? - Grey viscious clay, patches of dark grey clay. Moderate
35	420	545	1.0	566				quartz vein fragments to 3m wide x 10cm long
55	865	2100	1.5	430				OVERBURDEN - Black to brown clay, abundant quartz sand
							65270E	

Assays in ppm unless noted otherwise

Costean Line 50900N

314

5 cm

Amoco Minerals Australia Company

115316

costean profile

Project C.S.R. J.V. **No** A84-109	**Commenced** MAY 18 1984
Prospect Professor	**Completed** MAY 21 1984
Coordinates: **Line** 51100N	**Logged by** G. Kory
65374E **to** 65260E	**Sample length** 2 m
Total length 114 m	**Scale** 1:200 1cm = 2m

Gn = galena
Py = pyrite

Assays						Graphic geology (5m)	Meterage	Geologic description
Cu	Pb	Zn	Ag	Ba				
25	1750	3250	0.5	331			Py	LIMESTONE ? - Black clay containing moderate root material. Minor
25	1300	4000	1.5	341			Py 65370E	pyrite
40	3300	9050	2.5	287			Py	LIMESTONE ? - Dark grey gritty clay, Abundant quartz vein fragments. Minor
20	1000	2700	1.5	273			Py	pyrite. Minor grey Dolomite fragments
25	1800	3600	1.5	284				DOLOMITE - Grey finely crystalline, minor fine carbonate veining. Minor
5	380	940	0.5	120			Gn	galena in grey clay. Percentage of clay increases
45	2250	4300	2.0	355			Py 65360E	towards the west. Minor pyrite
30	1800	3850	1.5	265				
						SWAMP		65358E to 65314E not sample because of swampy ground conditions
60	640	680	1.5	159				DOLOMITE - Dark grey, very hard, finely crystalline. Abundant
45	725	1300	1.5	159			65310E	carbonate spots or "eyes" (2-3mm). Trace of galena
40	230	260	0.5	81				along fracture planes. Minor zones weathered to
25	305	415	1.0	81			Gn	grey sandy clay
45	3900	4850	2.0	204				
10	915	420	1.0	72				
80	1750	805	3.0	78			65300E	
75	1860	3700	6.0	161				
80	1.10%	5750	6.0	338				DOLOMITE ? - Fragments of dark grey dolomite in a mud matrix, may
55	7150	3750	4.0	493				be contaminated overburden.
65	1650	525	6.5	722				
35	4700	1500	2.0	301			65290E	DOLOMITE - Dark grey, finely crystalline. Minor carbonate eyes. Moderately
20	1650	895	1.5	142				dense
70	3100	760	2.0	324				
115	9350	3000	4.5	548				OVERBURDEN ? - Dark grey to brown viscous clay
290	1.40%	6000	15.5	52				LIMESTONE ? - Dark grey clay
70	2.36%	9850	2.5	241			65280E	
70	8950	1850	2.0	426				CALCAREOUS SILTSTONE ? - Dark green silty clay
10	350	65	2.0	563				SILTSTONE - Light grey, moderately bedded. Bedding at 145°/85°N
15	470	75	2.0	562				
10	340	35	1.5	591				
10	1250	250	2.0	536			65270E	SANDSTONE - Grey, fine grained, poorly bedded
100	1750	235	9.0	593				SILTSTONE/SHALE - Grey to dark grey siltstone, variable carbonaceous
15	175	20	2.5	626				laming. Minor shale.
5	75	15	2.5	555				
10	70	45	1.0	550			#	SILTSTONE - Dark grey to grey, abundant coral/bryozoa fossils. Poorly bedded
10	80	20	1.0	517			@ 65260E	SANDSTONE - Light grey to grey, fossiliferous

Assays in ppm unless noted otherwise

Costean Line 51100N

315

5 cm

Amoco Minerals Australia Company

costean profile

Project C.S.R. J.V. **No** A84-109		**Commenced**	May 17 1984
Prospect Professor		**Completed**	May 18 1984
Coordinates:	**Line** 51300N	**Logged by**	G. Kary
	65324 E to 65410E	**Sample length**	2 m
Total length	86 m	**Scale**	1:200 1cm = 2m

Assays						Graphic geology	Meterage	Geologic description
Cu	Pb	Zn	Ag	Ba		5m		py = pyrite gn = galena Sc - Crotty Quartzite Og - Gordon Limestone
5	5	25	X	598				
5	30	20	X	343		←		Sandstone - White to grey quartzite, variably
5	5	25	X	393				weathered to grey and brown sandy
X	X	10	X	321				clay. Minor bedding @ 095°/52°N
X	X	10	X	285			65400E	
X	X	10	X	195				
X	X	10	X	124				
X	X	10	X	97				
X	X	10	X	169				
X	X	10	X	17			65390E	
X	X	10	X	14				
X	X	10	X	19				
70	1500	185	0.5	308				
60	2400	230	1.5	331		←		OVERBURDEN - Unable to penetrate to bedrock. Sampled
60	225	20	5.0	387			65380E	light tan to olive coloured clay
X	10	20	X	607				overburden
X	15	20	1.0	535				
10	110	15	1.0	401				SANDSTONE? - light tan to brown clay. Trace of
40	1400	1600	1.5	363		Sc		shell casts or moulds
85	4350	5550	4.5	394			65370E	
25	2850	7350	3.5	318		Og		
45	3200	5650	3.5	347		←		LIMESTONE? - Dark green to grey clay. Minor carbonate
25	1.18%	1.3%	7.0	327		py, gn		pods. Up to 1% py, trace gn
535	1.34%	3.05%	14	154		gn ←		DOLOMITE - Grey finely crystalline. Minor dolomite
35	2850	3700	3.5	327			65360E	veining 1-2% gn
20	545	1850	1.5	173		←		DOLOMITE? - Grey, fine, sandy clay
5	355	1600	1.0	99		←		DOLOMITE - Grey, fine grained, minor fine dolomite
15	565	1350	1.0	242				veining. Slightly dense
35	1750	5500	3.5	390		py ←		LIMESTONE? - Black carbonaceous clay. Up to 1% py
10	125	370	0.5	178			65350E	Minor calcite veining
10	1650	2350	0.5	160				
5	980	665	1.0	62		←		DOLOMITE - Dark grey, finely crystalline. Minor
5	580	560	1.0	69				carbonate veining
10	735	435	0.5	63				
10	635	500	1.0	57			65340E	
5	755	485	0.5	62				
/	/	/	/	/	/			NOT SAMPLED - Missed 4m to avoid a
/	/	/	/	/	/			creek.
5	415	950	X	77		←		DOLOMITE - Light grey, fine grained. Highly fractured
10	255	675	0.5	190			65330E	Abundant calcite veining
5	115	290	0.5	113		←		LIMESTONE? - Grey clay, minor relict veining
5	35	45	X	67		←		LIMESTONE - Grey, abundant carbonaceous lamina. Moderate
X	55	45	X	47				calcite veining. Minor corals
							65320E	

115317

Assays in ppm unless noted otherwise

Costean Line 51300N

16

115318

APPENDIX 8

ORIGIN AND SIGNIFICANCE OF Pb-Zn-Ag GEOCHEMICAL ANOMALIES DEVELOPED IN REGOLITH IN PART EL 15/76 AMOCO/CSR JOINT VENTURE AREA, DUNDAS, TASMANIA

by Locon N Wall

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115319

FEBRIWOOD PTY. LTD.

Mr. G. Kary,
Amoco Minerals Australia Co.,
61 Counsell Street,
Zeehan, TASMANIA, 7469.

177 Bells Pocket Rd.,
Strathpine,
QUEENSLAND, 4500.
5/1/85

Dear Greg.,

Herewith the report on the 'Black clay' geochemical anomalies in your Dundas J.V. area, and the two MINPET reports which you loaned to me.

The various Amoco reports sent to me from your Sydney office were returned by Ansett air freight on 2 January 1985.

I enjoyed working with you and appreciated your assistance, traversing with the Bombadier was quite a memorable experience!

Please do not hesitate to raise any questions or criticisms, with regard to the report, and I will also be happy to assist in any further literature search, i.e. using different or modified search parameters, if required.

With very best wishes for the New Year and cordial regards,

Sincerely

Locon N. Wall

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115320

ORIGIN AND SIGNIFICANCE OF Pb - Zn - Ag GEOCHEMICAL ANOMALIES DEVELOPED IN REGOLITH IN PART EL 15/76 AMOCO/CSR JOINT VENTURE AREA, DUNDAS, TASMANIA.

REPORT PREPARED FOR AMOCO MINERALS AUSTRALIA CO.

BY LOCON N. WALL

DECEMBER 1984

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1. INTRODUCTION

High contrast, coincident lead-zinc-silver anomalies were revealed over an Ordovician limestone unit by shallow Jacro auger sampling in the Joint Venture area. Follow-up testing by costeaning showed the anomalies to be underlain by a dark grey to black, carbon-aceous clay regolith containing high grades of lead and zinc, up to 12% combine Pb-Zn in one instance, and silver which occasionally exceeded 100g/tonne.

Expectations of high primary metal grades were disappointed by the results of diamond drilling. Primary lead values were frequently only 20-30% of the tenor of surface material, while zinc and silver showed much more complex and variable relationships to surface grades. The results of costean sampling and associated diamond drilling are summarised in Appendix 6.1.

The purpose of this study is to investigate the nature and origin of the lead-zinc-silver anomalies and their relation to underlying primary metal grades.

Field work included inspection of costean sections and appraisal of geomorgpology which, with study of drill core and exploration records and preparation of the draft report occupied ten days in early December 1984.

2. DATA

The reports listed below, Table 1, contain all the available data pertinent to this study and a few are reproduced here.

Costeaning and diamond drilling were designed simply to follow up the base metal anomalies and consequently data which would be useful to this investigation are incomplete, e.g. diamond core has not been fully analysed, and elements such as Ba and Mn determined in core have not been determined in costean samples. Costeaning and drilling have been concentrated on what appears to be a single, mineralized limestone unit which can be traced throughout the E.L. area and this tends to bias the conslusions.

Moreover a number of the diamond holes were too shallow to intersect unweathered, mineralized zones, while others lack essential surface data.

Information on the primary variability of the Pb-Zn-Ag grades at Mariposa Mine is available from the North Broken Hill, 1981 report, Table 3, and Amoco diamond drill holes DTM - 84 - 2, 6 and 9.

Data directly pertinent to this study are mainly contained in diamond drill sections,

DTM - 84 - 1)
DTM - 84 - 2) Mariposa grid

DTB - 84 - 1) Bannockburn grid
DTBJ- 84 - 1 and 2 Blackjacks grid

details of which are contained in the Amoco reports listed in Table 1.

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TABLE 1 LIST OF REPORTS

Report Number	Contents
Amoco report No. 358, 376, 397	History of part E.L. 15/76 Amoco/CSR Joint Venture area, Dundas, Tasmania; geology; bedrock geochemistry; detailed costean sections and analytical results.
Minpet Reports Nos 59/84	Detailed mineragraphic descriptions of mineralization, primary lithologies and some surface samples.
Part of Minutes of the Dundas Joint Venture Meeting 17/9/84	Tabulated results of Jacro and Marlow drilling. Summary of costean and diamond drilling results. (Included here as appendix 6.1).
North Broken Hill Report 1951	Observations on the Mariposa Mine and summary of diamond drilling.

3. DISCUSSION

The problem of the formation of the geochemical anomalies has been approached by considering,

1. Primary compositional variation of the carbonate host rocks.

2. Form and variability of the primary lead-zinc-silver mineralization.

3. Effects of weathering on the carbonate units.

3.1 Primary compositional variations of the carbonate units.

The Ordovician carbonate units in the E.L. area consist of a series of steeply dipping interbedded dolomites, limestones, silts, clays and arenites, dolomite breccias, sideritised or sideritic carbonates, sideritic tuffaceaus carbonates, algal mat and bioclastic facies. Barite paleomorph horizons indicate periods of hypersaline cond-itions.

Rapid facies variations occur locally and regional lithological changes are also apparent e.g. carbonates appear to be more abundant in the sequences at Mariposa and Bannockburn prospects compared with the more argillaceous facies at Blackjacks.

The relative proportions of carbonate to non-carbonate components can vary considerably both between and within units, Table 2, and organic material, e.g. bituminous fronds in agal carbonates from DTSC - 84 - 5A (52.7m), is variably distributed throughout the carbonate sequences and has been estimated up to 11 vol. %, Table 2.

TABLE 2 Examples of carbonate units compositions

(after Minpet Report 59/84)

Sample Number	Mineralogy Vol.%									
	Calcite	Dolomite	Siderite	Ferroan Dolomite	Sericite Illite	Quartz/ Chert	Barite	Iron Oxides	Sulphide	Lithology
113951	-	87	-	10	-	<1	-	-	3	Dolomitsed Limestone
113952	-	42	-	20	15	19	-	2	2	Argillaceous Dolomite
113953	30	58	-	7	-	3	-	2	-	Fossil Breccia
113955	60	35	-	5	-	-	-	-	-	Fossil Breccia
113958	55	-	-	15	-	-	20	-	10	Ferroan Dolomite
113959	40	36	10	-	-	-	-	-	14	Veined Siderite Breccia
113961	19	80	-	-	-	-	-	-	1	Pisolite Limestone
Mariposa L59450N	5	-	89	-	2	4	-	2	-	Sideritised Calicite Sediment
Costean B/MPS3400	30	-	56	-	-	12	-	2	-	Sideritic Siltsone
D7SC-84 5A(56.5m)	-	-	88	-	-	5	-	-	-	Sideritised porph. Volc. rock
D7SC-84	-	62-53	20	-	-	/5	-	3	-	Algal Limestone (Bitumen 7 vol %

3.1 (cont.)

The preservation of primary sulphides into the regolith to produce geochemical anomalies overlying mineralized limestone units is considered to be largely controlled in the E.L. area by the ratio of carbonate to non carbonate components and the presence of abundant organic material in the parent rock. This is discussed in more detail in sections 3.3 and 3.4 below.

3.2 Primary lead-zinc-silver mineralization

Mineralization occurs as minor epigenetic veins and fracture coatings of galena, sphalerite and pyrite dispersed through the sequence, and as concordant syndiagenetic horizons such as that which formed the ore zone at Mariposa.

Concordant and epigenetic sulphide mineraliz-ation are characteristically highly variable in both width and continuity, a feature which produces rapid grade fluctuations between a few hundred parts per million to percent levels within one metre, e.g. diamond drill holeDTM - 84 - 8 interval 58 - 60m. On a larger scale, appreciable variation in Pb-Zn-Ag grades occur along the strike of the ore zone at Mariposa Mine, Fig 1 and Table 3.

It is evident that such high variability makes projection of grades down dip from the surface or between core intersections extremely difficult, and seriously complicates interpretation of geochemical anomalies. The mineralization is predominantly lead rich relative to zinc, Fig 2, and in detail the galena and sphalerite veins and crustiform syndiagenetic layers areindependantly distributed. There is no apparent correlation between zinc and lead grades, Fig 2, and minor veinlets, can occur erractically throughout the section.

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TABLE 3.

Summary grade and width intersections to show primary variability of concordent sulphide mineralization of Mariposa. (North Broken Hill Data 1951, Hole locations Fig 1).

Hole No.	Ore inter-sections	True Width	ASSAYS Pb	Ag.	Zn/	Vert. Depth of inter-section.
No.4	316' - 320'6"	3.5 ft.	5.3	1.6	1.7	225'
No.5	194' - 200'6"	5.5 ft.	9.4	2.3	2.5	113'
No.6	277' - 284'	4.0 ft.	5.5	2.2	0.8	170'
No.7	231' - 234'6"	3.6 ft.	13.8	3.4	1.5	170'
No.8	241' - 257'	12 ft.	8.3	3.2	1.7	180'
No.9	166'3"- 167'9"	1.2ft.	5.5	1.5	8.7	120'
	211' - 2.5'11"	4.0ft	8.8	2.3	1.8	145'
No.10	134'3"- 135'6"	0.8ft.	12.3	3.7	14.4	92'
	156'3"- 160'9"	3.0ft.	8.3	1.5	3.0	110'
	193' - 194'	0.7ft.	16.1	2.4	0.7	130'
No.11	375'6"- 383'	6.0ft.	13.9	13.9	1.9	240

Silver shows a correlation with lead in averaged grades from core intersections, Fig 3, but detailed examination of drill core assays shows a highly erractic association of silver with lead. It is likely that much of the silver occurs in variable solid solution with lead in galena, however some very high grades have been reported, e.g. 280 ppm in the 70-71m intersection of hole DTM - 84 - 4, which are inconsistent with the lead grades, Fig 3. Such high silver values may result from either rare free silver minerals, e.g. Matildile ($AgBiS^2$), contributions from argentiferous siderite and/or algal facies some of which in the Zeehan area have been reported to contain up to 230 ppm silver (Minpet Report No 71/84).

Copper grades associated with the lead-zinc are generally low, but rare chalcopyrite has been reported, DTM - 84 - 2 (139.5m).

Pyrite occurs in veins and clusters either independently or in Pb-Zn veinlets and crusts, and in an ext -remely fine grained, probably framoidal, syndepositional form.

Barite and manganese are both associated with the Pb-Zn-Ag sulphides, possibly in a zonal relationship, as evidenced from drill core assays.

3.3 Effects of weathering on carbonate units

Dark grey to black clays exposed in many costeans in the E.L. area invariably contain veins of shiny galena, sphalerite and vesicular quartz; fine laminations and micro-fractures; graphite coated fracture surfaces; diseminations and clusters of very fine pyrite; and small silicified fossils. Orientations of veins and laminae are consistent with attitudes deduced from diamond drilling

3.3 (cont.)

in the underlying limestone, and the other features are consistent with those observed in fresh core.

The carbonaceous black clays are generally totally free of carbonate and there is little doubt that they have been formed by <u>in situ</u> de-carbonation of the parent limestone. Similar solution of carbonates produces the residual "Clay with Flints" observed on flinty chalk hills and the "Terra Rosas" on limestones. In the E.L. area this process may still be active, and regionally there is evidence for the movement of bicarbonate saturated water as instanced by the miner's hat preserved in carbonate at the Spray Mine, and now exhibited at the Zeehan museum.

The limestones are topographically recessive in the E.L. area and form the valley floors between ridges of Crotty Quarzite. This geomorphological setting allows high groundwater flow through the limestones which in the past has been sufficient to leach karst caverns, now filled with silts. However, the high carbon content of the residual black clay regolith produces a highly reducing environment in which fresh primary sulphides are preserved to the surface. Secondary metal carbonates have not been observed in costean sections, although the sulphides are quite reative when exposed by excavation, e.g. botryoidal smithsonite was observed in spoil heaps on Sunny Corner costean, Line 4, which had been exposed for approximately seven months. Similarly cerrusite has been observed as in acicular crystals in spoil at Mariposa, which indicates that secondary carbonates will form as soon as conditions become oxidising.

Leaching of carbonates from argillaceous

3.3 (cont.)

limestones to form muds and clays also occurs down faults, an effect well developed at the Mariposa shaft which penetrated 30 metres of black "pug", probably formed along the fault intersected at 105-110 metres in hole DTM -84 -2.

Field observation shows that outcrops of the various facies of the limestone units are generally almost totally decarbonated. The readily identifiable calcareous siltstones at Blackjacks costean 60800N are good examples and it is likely that the thicknesses and compositions of residual black clays depends on the ratios of carbonate and carbonac -eous components to the clastic and siliceous components in the underlying parent rock. This produces a variable regolith as seen in the costean sections, e.g. Sunny Corner costean Line 1 where a sideritic, tuffaceous unit seems to persist to the surface adjacent to a carbonaceous, decarbonated black clay with primary sulphides. The tuffaceous unit is oxidised at the surface in literally sharp contrast to the reduced black clays.

In summary, the steeply dipping, mineralized limestone unit weathers <u>in situ</u> by decarbonation to a black to dark grey, residual, highly reducing, carbonaceous regolith which retains sulphides and other primary features.

3.4 Dispersions of Pb-Zn-Ag in the regolith

The high contrast lead-zinc-silver anomalies normally occur in the black clay regolith which the discussion in 3.3 above attempted to show is a residual, decarbonated residual facies of the parent limestone.

The mineralogy of the mineralized carbonate facies identified in drill core, summarised in Table 3, shows

3.4 (cont.)

that on average the potentially soluble carbonate exceeds 70 vol%.

Total removal of the soluble fraction would mass-ively upgrade the relative percentage of sulphide, e.g. the 2.5% lead reported in hole DTM -84 - 2 could be concentrated to approximately 8% lead in the residual clay, assuming no oxidation and total decarbonation. While exact correlation is difficult due to variations in both limestone composition and primary lead tenor, the surface projection of the mineralized unit in this section yields 11% lead, which would be the expected order of magnitude allowing for total decarbonation.

Similarly the limited data on section DTM - 84 - 1 shows a primary lead grade of about 0.03% lead which is reflected on the surface in black clay averaging a 0.4% Pb. At Bannockburn an intersection of blebs of galena and sphalerite averaging 0.4% Pb at 70m vertical dpth are reflected by surface grades of 1.8% Pb.

The proposition tha galena does persist in the black clay without significant secondary modification is supported by the lead to silver relationship, Fig 4, in averaged costean sections, lead >0.5%, which is seen to be similar to the primary lead-silver relationships, Fig 3, while the general scattered pattern of lead-zinc association is also preserved between the primary, Fig 2, and regolith, Fig 5 dispersions. (Note: regolith dispersions are complicated by the sampling procedure, section 3.5 below, and possibly minor hydromorphic effects, especially in the case of silver).

Sphalerite is concentrated in the black clay in the same manner as galena, but the primary variability

3.4 (cont.)

is such that it is difficult to correlate anomalous grades in regolith with underlying grades intersected in drill holes. Zinc may show the approximate four fold concentration factor, as in DTM - 84 - 3 (N.B. weathered section); through to comparable grades as seen in DTM - 84 - 2 where 1.2% Zn at the surface is underlain by similar grades at 50 and 100m. Sphalerite crystals at the surface in black clay are the same honey coloured, iron poor, low temperature form as occurs in the underlying limestone e.g. Blackjacks costean 60800N, but slight tarnishing of the near surface sphalerite crystals suggests weak hydromorphic activity.

Silver shows probable general tendency to follow lead in the black clays, Fig 4, but some very high fluctuations occur, e.g. at Mariposa, due to either primary silver mineral or hydromorphically derived from neighbouring algal and sideritic units.

Secondary pyrite is occasionally observed in the lower plant root zone at Mariposa, and shallow bands of pyrite parallel to the surface have been reported in black clay facies at localities outside of the E.L.. These features lend weight to the suggestion of hydromorphic re-deposition of secondary sulphides in the highly reducing black clay facies. Silver could be included in secondary pyrite or deposited as complex organic species. The magnitude of the effect of hydromorphic remobilisation is unknown; the Pb/Ag ratio in the black clay, Fig 4, appears to be higher than the primary ratio, Fig 3, but this may be an artifact of the data rather than a secondary, hydromorphic remobilisation of lead, silver or both. The primary Pb-Ag relationship seems to survive in the black clay and on balance hydromorphic effects seem small.

The wild variations in Pb-Ag grades observed

3.4 (cont.)

in the primary mineralization are reflected in the black clay regolith and evidenced by the results of the two metre interval sampling of costeans, e.g. costean Bannockburn Line 56900N, 65805E where lead values range from 0.8% to 7% over 2 metres, and in the experimental Marlow Flow Through drilling, Fig 6.

These highly fluctuating metal grades reflect the nature of the primary mineralisation which is obscured when the data are averaged to give grades and widths such as those cited in Appendix 6.1, a procedure which when taken with the mechanical upgrading effect can be misleadingly optimistic.

The reducing environment of the black clays contrasts with the intensely oxidised supergene zone at Tynagh, Eire. The Eh-pH stability fields for the various supergene assemblages at Tynagh are shown in Fig 7, and it can be seen that they all occur in varyingly oxidising environments, while the black clays in the E.L. probably lie in the range of Eh approximately -2V and pH 5.5-7, although pH 3 was observed at one point in the costean Sunny Corner Line 1. In such an environment as the latter the metal sulphides and bicarbonate radical are stable, conditions which permit carbonate leaching while preserving sulphides.

Inspection of the averaged Pb-Zn-Ag tenors in black clay regolith developed in different parts of the E.L. reveals no convincing differences in compositions although Mariposa displays some high silver values in excess of 100 ppm, Figs 4 and 5. Detailed statistical analysis of costean results may reveal differences in Pb-Zn and Ag distributions between prospects, and the geochemical discrimination may be enhanced by extending the range of elements to include,

3.4 (cont.)

inter alia, those which reflect the primary depositional environment. In the absence of additional data, statisical work on the Pb-Zn-Ag data alone will probably prove inconclusive in discriminating between the potential of anomalies.

4. CONCLUSIONS

The black clay regolith formed over mineralized carbonaceous limestone unit in the E.L. area has been formed in situ by groundwater leaching of soluble carbonate fraction, while the very high organic content has prevented oxidation with the consequent survival of the primary sulphides. Minor, but variable, hydromorphic redistribution particularly of silver and zinc may have occured, and there is evidence for some downslope creep, e.g. overturned pyrite veins at costean Line 1 Sunny Corner and silicified fragments of primary sulphides 30m downslope from their source on a silicified fault in costean 57800, Sunny Corner.

Lead seems to show a fairly consistent, approximately four fold enhancement of tenor in the regolith versus primary grades intersected by drilling in the examples studied. The effect is largely dependant on the relative content of soluble carbonate in the parent limestone, and more data would probably reveal a more variable relationship.

Silver tends to follow lead, but the dispersion is highly variable and difficult to relate directly to observed primary grades, while zinc tends to show a generally more erratic primary dispersion compared to lead which is reflected in the surface dispersions.

While the Pb-Zn-Ag anomalies in residual black clays in the E.L. area clearly reflect the underlying mineralized limestone unit

4. CONCLUSIONS (cont.)

it is evident that prediction of parent primary grades is at best an educated guess for lead, and almost impossible for silver and zinc. However the high contrast anomalies clearly identify the prospective limestone unit, and can be used as a mapping tool to define areas for detailed follow up sampling and geoph -sical testing.

5. RECOMMENDATIONS

5.1 The Pb-Zn-Ag anomalies should not be ranked on the basis of metal tenors alone.

5.2 Regolith sampling should be used as a reconnaissance mapping tool to outline prospective units for follow up by detailed bedrock sampling.

5.3 In interpreting the results of both regolith and bedrock sampling care should be taken to avoid averaging the data in such a way that it obscures the magnitudes of short range grade fluctuations.

5.4 Further work to understand the regolith anomalies is not justified. Drilling targets should be selected on the results of bedrock sampling, geophysical anomalies, and geological setting in terms of the depositional environment etc..

5.5 Interpretation of both regolith and bedrock anomalies would be assisted by extending the range of elements to include those, such as Ba, Fe, Mn, Hg etc. which provide information on the primary depositional environment.

4. CONCLUSIONS (cont.)

5.6 In general terms every opportunity should be taken to identify primary geochemical halos e.g. Fe, Mn, Ba dispersions and Pb/Zn and Fe/Ca, Mg and Mg/Zn etc. ratios, some of which may persist into the regolith and thus provide a means of assessing the sub-surface potential of Pb-Zn-Ag anomalies in the regolith. (To this end the Amoco core from Mariposa should be systematically sampled over one metre intervals and analysed for a range of elements, including mercury, thallium and the alkali metals. Attention should also be given to variations in dolomite chemistry, although this will require additional petrology and special anal-ytical work.)

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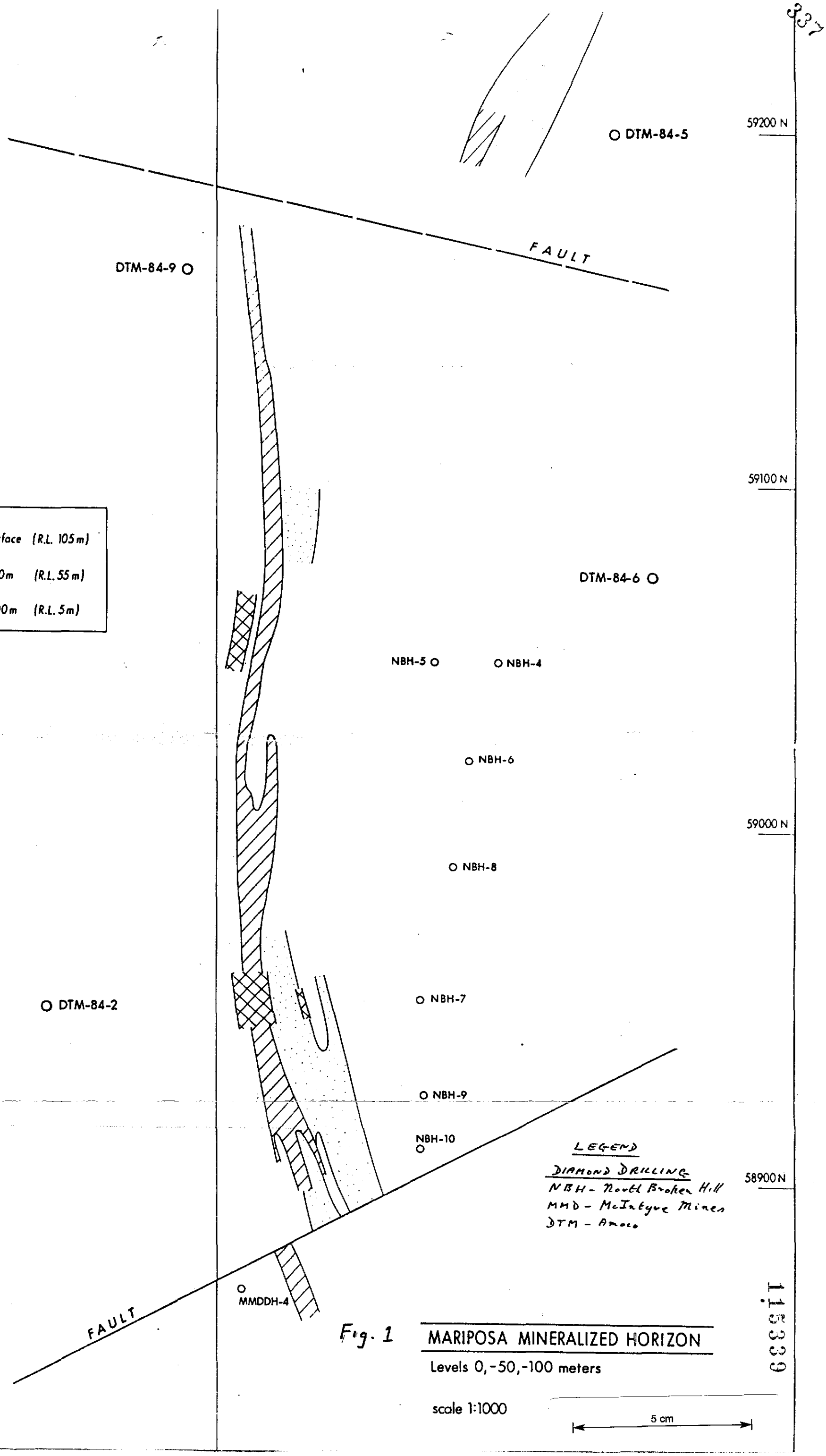

Fig. 1 MARIPOSA MINERALIZED HORIZON

Levels 0, -50, -100 meters

scale 1:1000

1153339

Fig. 2. Primary lead-zinc relationships (Pb > 0.5%, Mariposa and Sunny Corner diamond drill core)

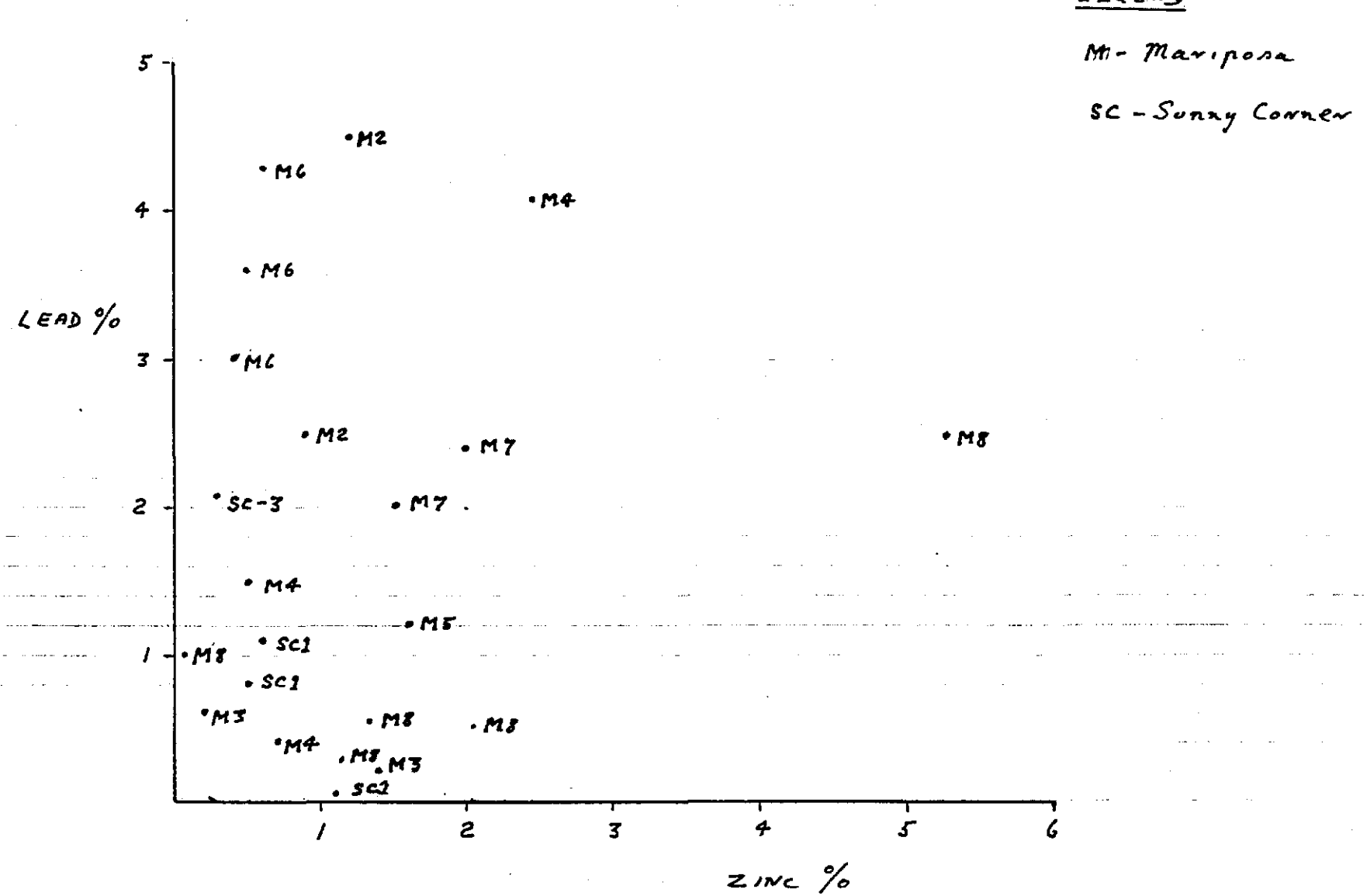

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Fig. 3 Lead-silver relationships in high grade drill core sections (Pb > 0.5%, Mariposa and Sonny Corner diamond drill core)

M- MARIPOSA
SC - SUNNY CORNER

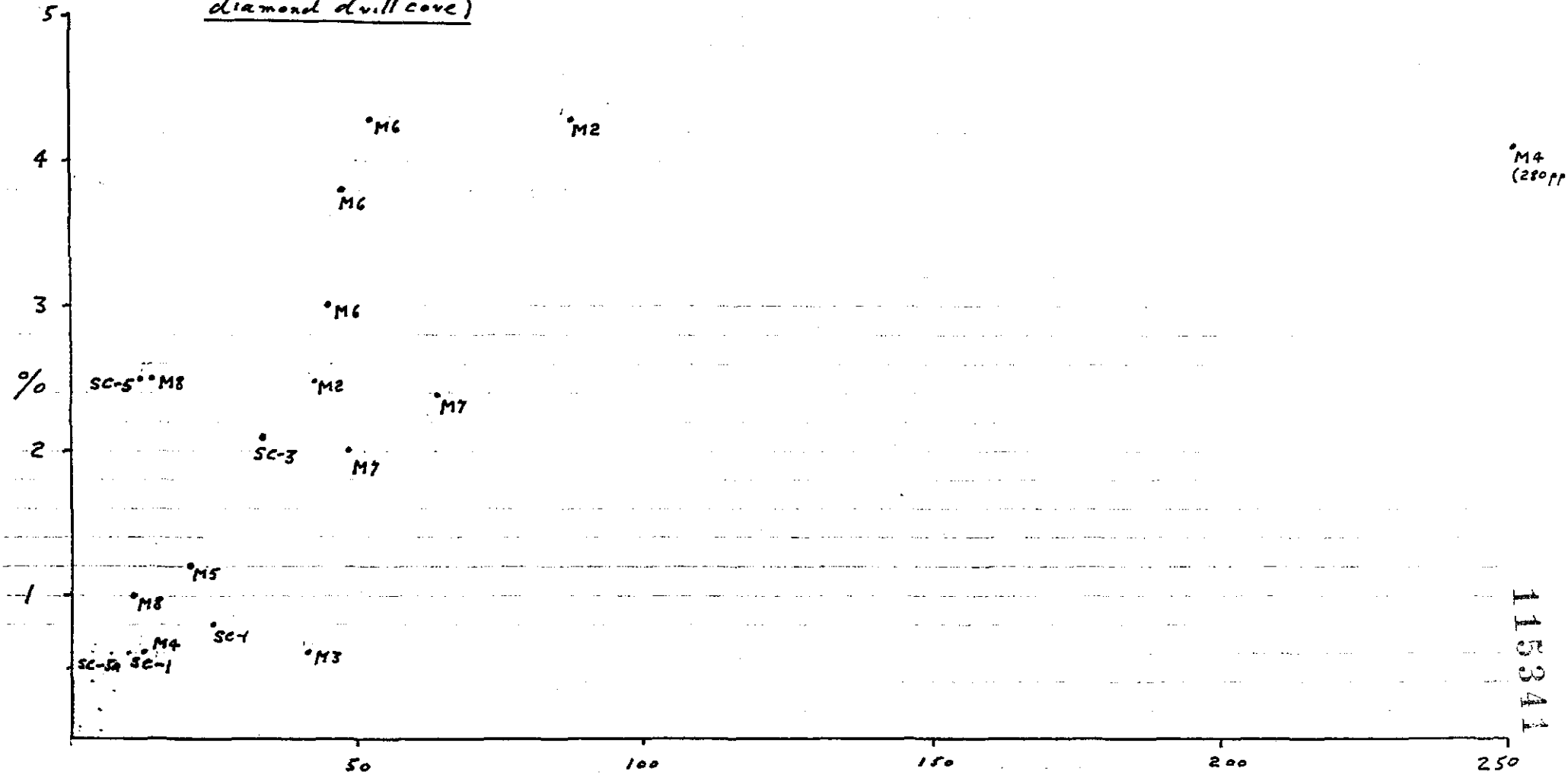

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Fig. 4 Black clay lead - silver relationships.
(Costean sections; averaged data, Pb > 0.5%)

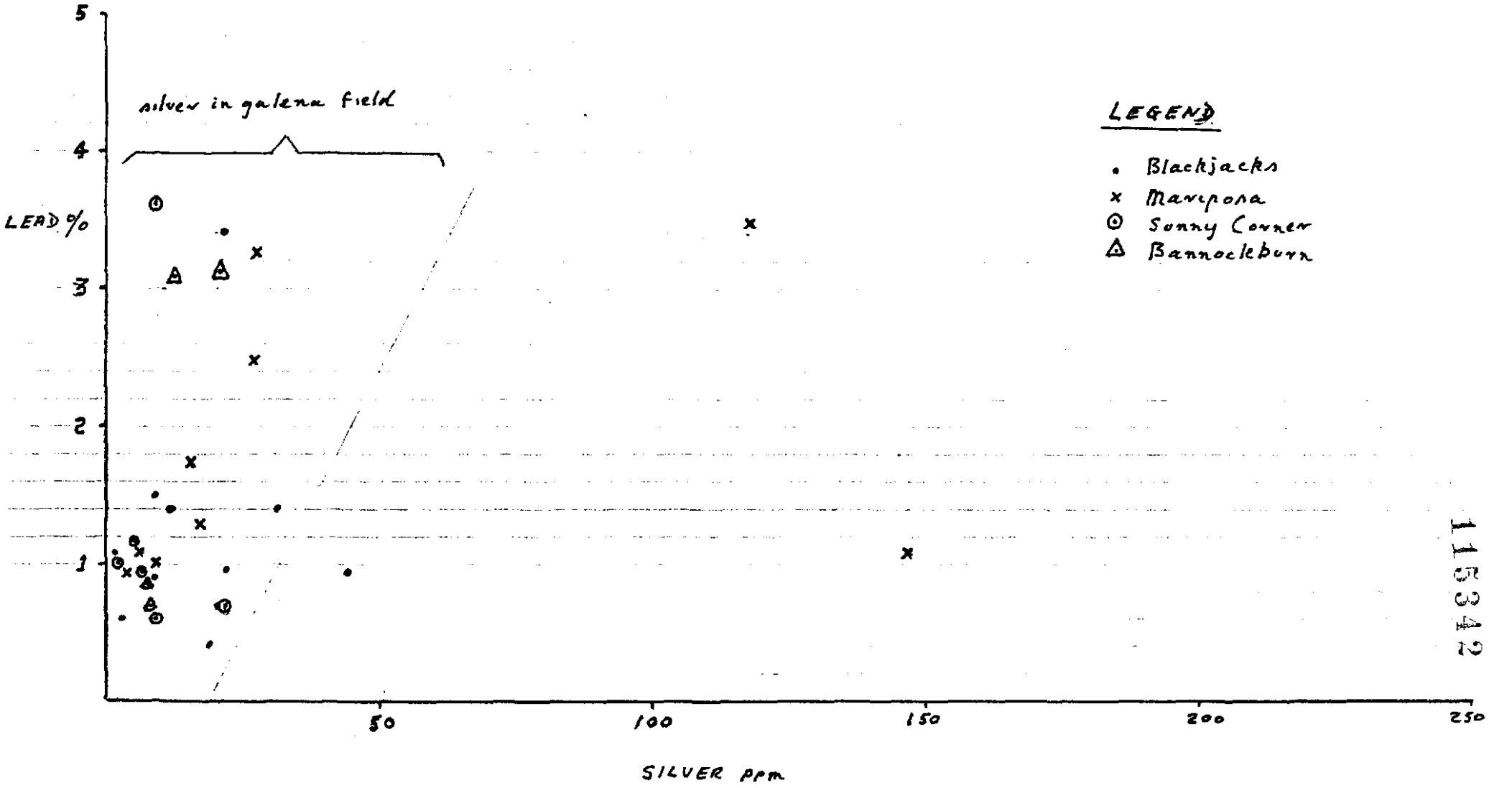

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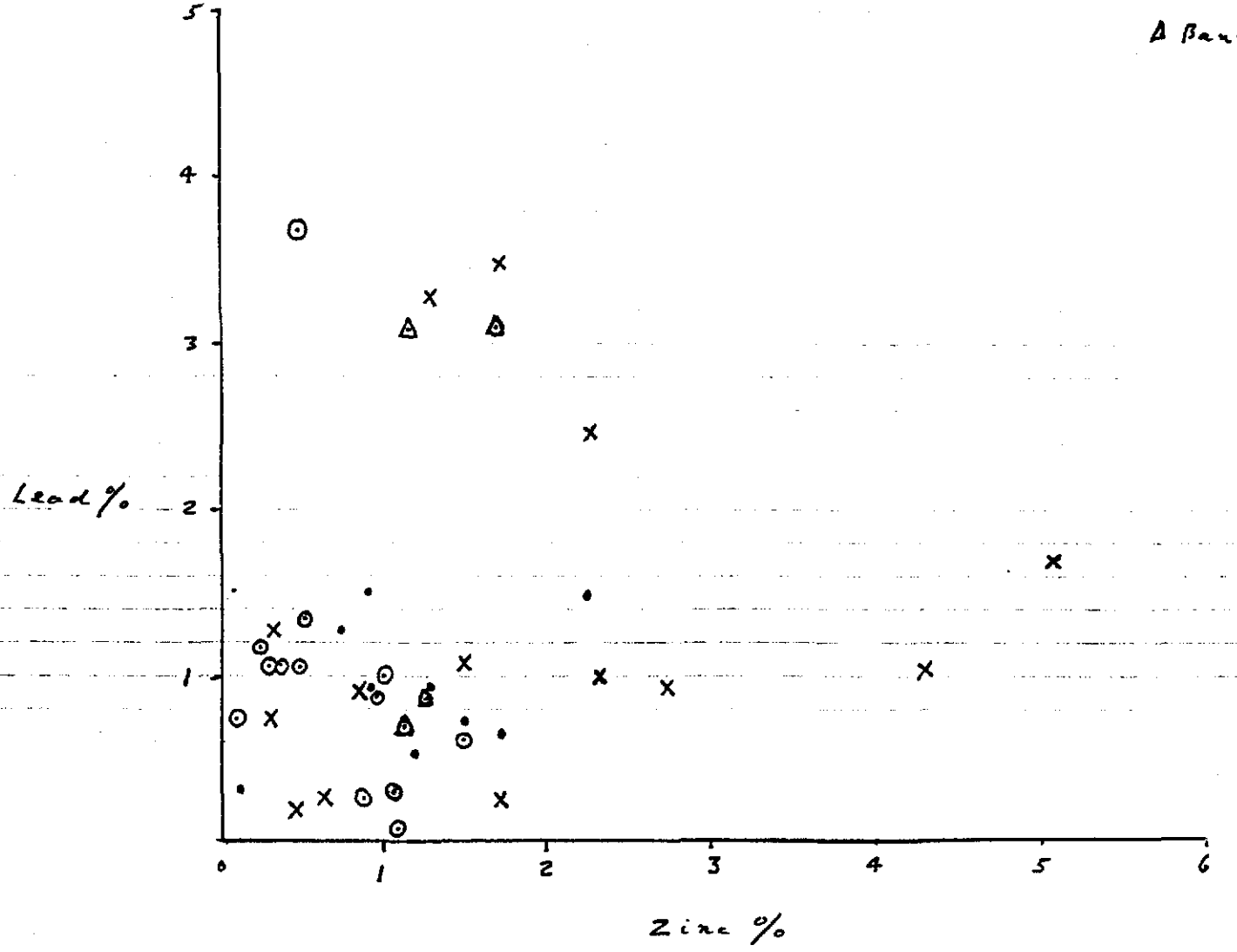
Fig 5 LEAD-ZINC RELATIONSHIPS IN HIGH GRADE COSTEAN SECTIONS. (Averaged data, Pb > 0.5%)

LEGEND

• Blackjacks
x Manipora
⊙ Sunny Corner
Δ Bannockburn.



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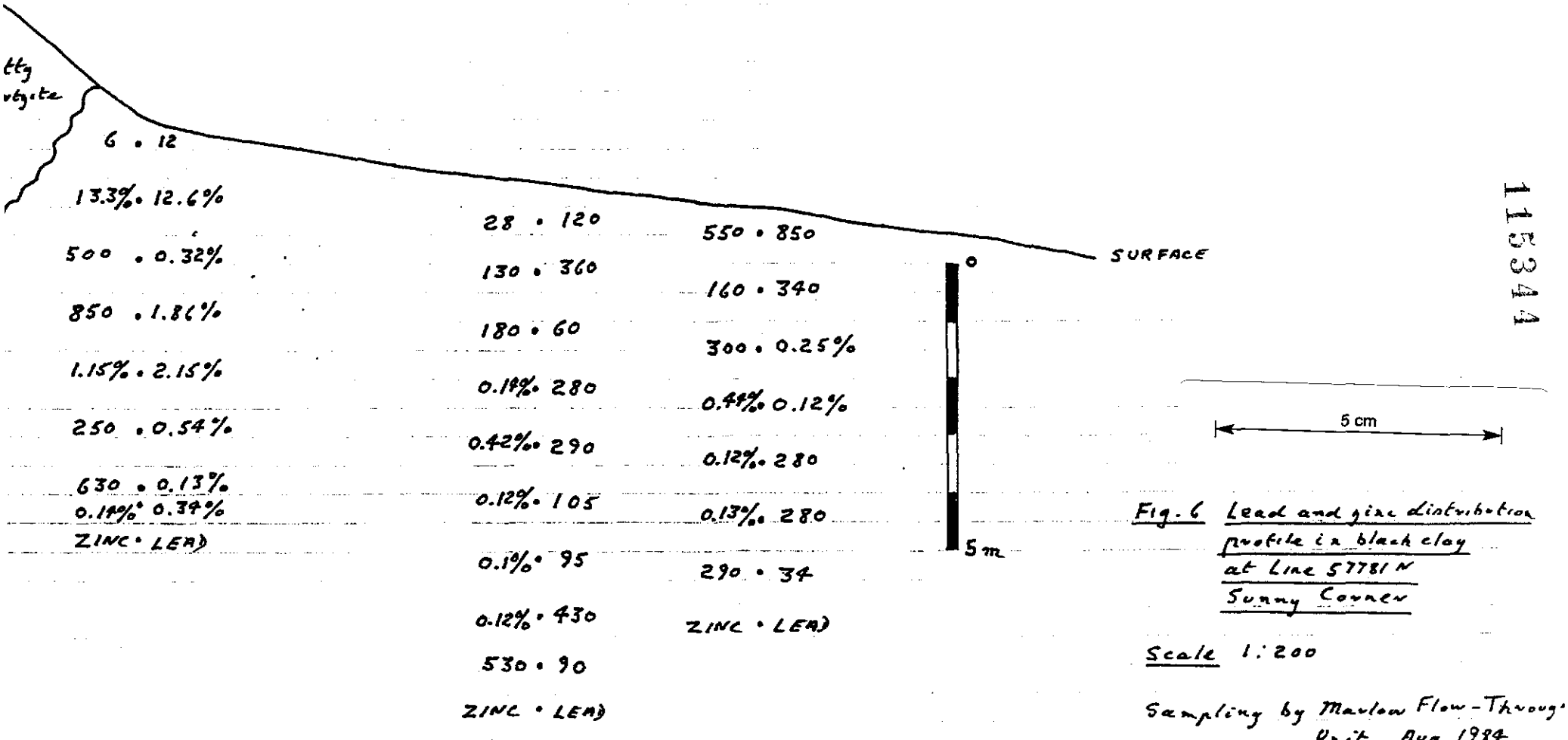

Fig. 6 Lead and zinc distribution profile in black clay at Line 57781 N Sunny Corner

Scale 1:200

Sampling by Marlow Flow-Through Unit. Aug. 1984

VALUES IN ppm UNLESS INDICATED OTHERWISE

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115345

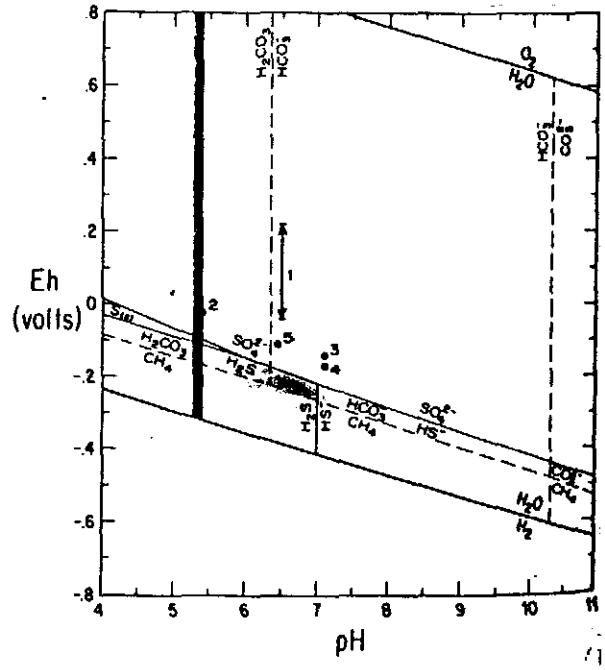

Fig. 7 *Eh-pH stability regimes of supergene environments at Tynagh, Eire. (From Sangameshwar, S.R. and Barnes, H.L. 1983, Econ. Geol., 78, pp1379-1397)*
Heavy vertical line indicates lowest pH value possible for ground water.
Numbers refer to different ore types:-

No.	*Ore type*
7	*Pb-Cu oxide*
2	*Pb oxide*
3	*Pb-Zn oxide*
4	*Zn oxide*
5	*Ag oxide*

Coloured area is probable Eh-pH regime of black clay environment in the Dundas J.V. area.

APPENDIX 6.1 Part of minutes of the Dundas

Joint Venture Meeting 17/9/84 .

Blackjacks:

Trenches were designed to test for extension of surface geochemistry north and south of previously defined anomalous zones. Five trenches were excavated totalling 484 meters. Best results are:

L 61050N	67194-220E =	26m @ 1.56% Pb, 0.91% Zn, 8.15 g/t Ag
L 60700N	67230-232E =	2m @ 0.13% Cu, 0.35% Pb, 0.14% Zn, 36 g/t Ag
	67240-242E =	2m @ 0.97% Pb, 0.97% Zn, 44 g/t Ag
	67246-248E =	2m @ 0.59% Pb, 1.20% Zn, 19 g/t Ag
	67250-254E =	4m @ 0.78% Pb, 1.45% Zn, 21 g/t Ag
L 60650	67238-242E =	4m @ 0.62% Pb, 1.77% Zn, 4.5 g/t Ag
	67258-262E =	4m @ 0.97% Pb, 1.27% Zn, 21.5 g/t Ag
	67272-274E =	2m @ 1.23% Pb, 0.75% Zn, 24 g/t Ag
	67290-282E =	2m @ 1.48% Pb, 2.22% Zn, 31 g/t Ag

Following recommendation by CSR, double sampling of a number of two meter intervals was completed. One sample was taken as a channel sample from both walls just above the floor of the costean. The second sample was from bulk sample removed by the excavator. Each sample represents a two meter interval. Results are tabled below (Table 1).

TABLE 1 - SAMPLE PROCEDURE COMPARISON

Sample	Lead		Zinc		Silver	
	A	B	A	B	A	B
103517	370	0.97%	0.185%	0.97%	1.5	44
103518	0.39%	660	0.79 %	0.285%	118	3.0
103519	905	0.34%	0.38 %	0.75%	4.0	13.0
103520	0.27%	0.59%	0.69 %	1.20%	5.0	19
103522	0.415%	970	0.39 %	0.385%	1.0	2.5
103523	1.49%	1.11%	2.79 %	1.73%	104	33
103524	0.97%	0.44%	2.03 %	1.17%	37	9
103525	535	425	0.275%	0.22%	1.5	1.5
103526	580	195	0.285%	0.135%	0.5	2.0
TOTAL	3.774%	3.675%	7.815%	6.845%	272.5	127.0

ppm unless indicated

A = 2 meters bulk excavator sample

B = 2 meters channel sample (both walls)

Mariposa Prospect

Infill lines at 50 meter spacings were trenched to better define mineralization encountered to date on both the eastern and western zones in the limestone. Five trenches were excavated totalling 294 meters. Best results are:

L 5955ON	67174-188E =	14m @ 1.0% Pb, 2.38% Zn, 9 g/t Ag
	incl	4m @ 1.68% Pb, 5.13% Zn, 16 g/t Ag
	67232-238E =	6m @ 3.27% Pb, 1.27% Zn, 28 g/t Ag
L 5945ON	67294-298E =	4m @ 2.48% Pb, 2.14% Zn, 28 g/t Ag
	67306-310E =	4m @ 1.13% Pb, 1.55% Zn, 6 g/t Ag
	67322-326E =	4m @ 0.95% Pb, 0.86% Zn, 3 g/t Ag
L 5925ON	67152-162E =	10m @ 0.79% Pb, 0.38% Zn, 11 g/t Ag
	incl	2m @ 1.26% Pb, 0.35% Zn, 17 g/t Ag
L 5915ON	67310-314E =	4m @ 0.18% Pb, 0.44% Zn, 24 g/t Ag
	67332-334E =	2m @ 0.25% Pb, 0.61% Zn, 33 g/t Ag
	67336-348E =	12m @ 0.99% Pb, 2.72% Zn, 73 g/t Ag
	incl	6m @ 1.08% Pb,4.35% Zn,146 g/t Ag
L 5885ON	67314-320E =	6m @ 3.55% Pb,1.75% Zn,128 g/t Ag
	incl	2m @ 8.30% Pb, 3.33% Zn, 377 g/t Ag
	67324-326E =	2m @ 0.21% Pb, 1.77% Zn, <0.5 g/t Ag
	67320-324E =	Impenetrable gravel

Bannockburn Prospect

Eight trenches were excavated totalling 444 meters. Seven trenches were cut at Sunny Corner to test the continuity of previously intersected mineralization and one trench over the old Bannockburn workings. Best results are:

Sunny Corner: (see geology map for locations)

Line 1	4 - 10 = 6m @ 3.64% Pb, 0.46% Zn, 6 g/t Ag
Digging @ 217°T	32 - 34 = 2m @ 1.05% Pb, 0.32% Zn, <0.5 g/t Ag
	72 - 74 = 2m @ 0.24% Pb, 0.92% Zn, <0.5 g/t Ag
Line 2	42 - 44 = 2m @ 0.08% Pb, 1.10% Zn, 2 g/t Ag
Digging @ 100°T	
Line 3	18 - 26 = 8m @ 1.03% Pb, 0.48% Zn, 2.5 g/t Ag
Digging @ 070°T	
Line 4	42 - 56 = 14m @ 0.60% Pb, 1.25% Zn, 9 g/t Ag
Digging - 000°T	60 - 62 = 2m @ 1.00% Pb, 1.01% Zn, 1 g/t Ag
Line 5	2 - 6 = 4m @ 1.18% Pb, 0.23% Zn, 5 g/t Ag
Digging @ 210°T	12 - 14 = 2m @ 0.88% Pb, 0.95% Zn, 6 g/t Ag
	52 - 56 = 4m @ 1.08% Pb, 0.35% Zn, 1 g/t Ag
	58 - 60 = 2m @ 0.78% Pb, 0.13% Zn, 23 g/t Ag
	78 - 80 = 2m @ 1.37% Pb, 0.52% Zn, 0.5 g/t Ag

Bannockburn Prospect

L 57647N	65684-696E = 12m @ 3.15% Pb, 1.66% Zn, 22 g/t Ag
	65702-710E = 8m @ 0.70% Pb, 1.17% Zn, 7 g/t Ag
L 57550N	65702-706E = 4m @ 0.86% Pb, 1.26% Zn, 8 g/t Ag
L 56950N	65770-774E = 4m @ 3.14% Pb, 1.19% Zn, 10.5 g/t Ag

Professor Prospect

Four trenches totalling 308 meters were excavated over zones of anomalous bedrock geochemistry defined by Jackro auger sampling program. The anomaly occurs at the Crotty Quartzite - Gordon Limestone contact. Best results are:

L 50900N	65216-218E = 2m @ 0.03% Pb, 1.17% Zn, <0.5 g/t Ag
	65354-360E = 6m @ 0.5% Pb, 0.8% Zn, 2 g/t Ag

L 51100N 65278-286E = 8m @ 1.4% Pb, 0.5% Zn, 6 g/t Ag
65294-298E = 4m @ 0.9% Pb, 0.5% Zn, 5 g/t Ag

L 51300N 65362-366E = 4m @ 1.26% Pb, 2.18% Zn, 11 g/t Ag

Bedrock Sampling

Five lines at Mariposa and three lines at Blackjacks were sampled using a Marlow Flow Through sampling unit. These lines were run to provide a comparison with Jackro auger sample results. The Marlow unit is able to penetrate deeper than the Jackro. An attempt was made to reach fresh bedrock at each site (>25m in some areas). Comparisons of both sampling results for typical lines are tabled below.

Mariposa Grid

L 58800N - sample depth in brackets (meters)
- values in ppm unless noted

	Pb		Zn		Geology
Easting	Jackro	Marlow	Jackro	Marlow	
67125	180 (2.5)	65 (5.3)	36	90	
67150	1300 (1.0)	135 (1.6)	40	50	
67175	120 (5.0)	20 (5.3)	350	22	
67200	190 (1.4)	24 (1.2)	210	20	
67225	175 (<1.0)	12 (12.2)	480	18	
67250	44 (1.0)	20 (1.6)	38	32	
67275	185 (1.0)	38 (1.5)	90	70	
67300	32 (1.0)	30 (8.0)	8	1800	Gordon Limestone
67325	340 (5.0)	70 (13.3)	360	1200	Fault Zone
67350	810 (5.0)	60 (8.6)	450	30	Dundas Formation

Mariposa Grid

L59600N

	Pb		Zn		Geology
Easting	Jackro	Marlow	Jackro	Marlow	
67150		490 (4.8)		50	
67175	145 (4.0)	1.13%(5.0)	60	3400	

67200	7800 (5.0)	6600 (13.8)	1.65%	7500	
67225	1350 (5.0)	290 (20.6)	1000	660	
67250	560 (1.9)	55 (25.0)	360	105	
67275	330 (5.0)	130 (11.8)	250	380	
67300	190 (5.0)	180 (12.3)	270	150	Gordon Limestone
67325	4400 (5.0)	95 (11.8)	4000	510	Fault Zone ?
67350	60 (0.75)	320 (22.4)	75	1500	Dundas Formation
67375	95 (5.0)	60 (3.4)	260	50	
67400	44 (1.0)	26 (2.8)	104	65	

Blackjacks Grid

L61200N

	Pb		Zn		Geology
Easting	Jackro	Marlow	Jackro	Marlow	
67000	<4 (5.0)	10 (12.5)	2	8	
67025	22 (5.0)	16 (9.5)	32	18	Crotty Quartzite
67050	100 (2.0)	26 (9.4)	50	42	Fault Zone
67075	8 (5.0)	300 (8.0)	<2	38	Gordon Limestone
67100	10 (5.0)	520 (9.0)	<2	30	
67125	28 (5.0)	60 (13.0)	6	280	
67150	6500 (2.0)	810 (17.4)	10	910	
67175	70 (3.5)	36 (4.7)	330	130	
67200	190 (2.0)	115 (5.8)	220	440	
67225	220 (2.5)	70 (10.7)	430	260	
67250	830 (3.5)	4100 (3.6)	1550	2400	

Soil profiles at Blackjacks and Sunny Corner have been taken using the Marlow sampling unit. Samples were taken every two or three meters. Due to the small sample size very little geological information can be obtained. Results show a definite down-slope blooming of bedrock geochemistry.

Geophysics

VLF:

Initially all of the Mariposa grid and costeaned portions of the Blackjacks

grid were surveyed using Amoco's Crone VLF meter and North West Cape as a signal source. Following recommendation by John Bishop (Mitre Geophysics), Japan was used as a signal source on all north-south trending grids. For comparison purposes all grids (Blackjacks, Mariposa and Bannockburn) were surveyed using both Japan and North West Cape as signal sources. A Phoenix VLF 2 meter was used on these surveys. Mitre Geophysics was contracted to plot all data. All results are not yet to hand.

Drilling

2023 meters of the proposed 2000 meter drilling program on the Blackjacks, Mariposa and Bannockburn grids have been completed. Drilling is still in progress at Sunny Corner (Bannockburn grid) and Mariposa grid. Summaries of all completed holes are listed below.

Blackjacks Grid

Hole No	Coordinates	Declin/Azimuth	Final Depth
DTBJ-84-1	60830N:67225E	-40°/075°T	102.5m

Target - Source of 16m @ 0.2% Pb, 1.9% Zn, 4.3 g/t Ag costean geochemistry

Result - 0 - 102.5m - Gordon Limestone

- Trace of galena and sphalerite in calcite veins

DTBJ-84-2	61050N:67160E	-45°/075°T	98.5m

Target - Source of 26m @ 1.56% Pb, 0.91% Zn, 8.15 g/t Ag costean geochemistry

Result - 0 - 23.0m - Crotty Quartzite

23 - 98.5m - Gordon Limestone

- Cavity at projected dip of mineralization (47.5-53.5m)
- No visible mineralization

Mariposa Grid

DTM-84-1	58800N:67248E	-52°/072°T	126.0m

Target - Source of 22m of anomalous costean geochemistry including 6m @ 6.2% Pb, 5.5% Zn, 257 g/t Ag

Results - 0 - 113m - Gordon Limestone

Trace of galena/sphalerite in siderite and dolomite veins within limestone

113 - 119m - Fault zone. Anomalous Pb/Zn geochemistry
119 - 126m - Dundas Formation

DTM-84-2 58950N:66999E -60°/072°T 186.0m

Target - To test under Mariposa workings. To test source of gravity and IP anomalies over the Mariposa workings.

Results - 0 - 53m - Crotty Quartzite
53 - 186m - Gordon Limestone
131 - 151m - 20m @ 2.5% Pb, 0.9% Zn, 43.4 g/t Ag, 0.3% Ba
incl 133 - 140m - 7m @ 4.5% Pb, 1.2% Zn, 86.3 g/t Ag, 0.2% Ba
- in a zone of intense siderite, calcite and dolomite

DTM-84-3 58825N:67288E -40°/072°T 70.0m

Target - To test eastern mineralized zone 25 meters north of DTM-84-1. Designed to intersect mineralized zone at <25 meters vertical depth

Results - 0 - 66m - Gordon Limestone
21 - 24m = 3m @ 0.6% Pb, 0.20% Zn, 36 g/t Ag
28 - 31m = 3m @ 0.2% Pb, 1.40% Zn, 5 g/t Ag
Mineralization occurs within siderite/calcite veins in dolomitized, brecciated limestone sequence
66 - 70m - Dundas Formation

DTM-84-4 59193N:67310E -40°/072°T 77.3m

Target - Source of 8m @ 3.3% Pb, 6.2% Zn, 395 g/t Ag costean geochemistry. To test associated VLF anomaly

Results - 0 - 73m - Gordon Limestone
41 - 42m = 1m @ 0.4% Pb, 0.7% Zn, 4 g/t Ag
57 - 58m = 1m @ 0.5% Pb, 1.5% Zn, 13 g/t Ag
70 - 71m = 1m @ 4.1% Pb, 2.45% Zn, 280 g/t Ag
Mineralization occurs within calcite/siderite veins in variably weathered dolomitized and brecciated limestone. Minor silicification associated with fault zone at 73m
73 - 77m - Dundas Formation

DTM-84-5 59200N:67160E -40°/252°T 145.7m

Target - Source of 22m @ 1.0% Pb, 0.2% Zn, 63.6 g/t Ag costean geochemistry

Results - 0 - 145.7m - Gordon Limestone

44 - 53 = 9m @ 1.2% Pb, 1.6% Zn, 21.4 g/t Ag

Mineralization occurs as variably oxidized galena and sphalerite in clays. Clay probably represents a completely weathered limestone sequence

DIM-84-6 59075N:67170E -45°/252°T 238m

Target - To test continuity of mineralization intersected in DIM-84-2 Designed to cut mineralized horizon at a vertical depth of 130m

Results - 0 - 238m - Gordon Limestone

158 - 166 = 8m @ 3.0% Pb, 0.4% Zn, 44.8 g/t Ag, 0.5% Ba

4m @ 3.6% Pb, 0.5% Zn, 52 g/t Ag

2m @ 4.3% Pb, 0.6% Zn, 52.5 g/t Ag

DIM-84-7 59419N:67300E -45°/072°T 65.5m

Target - Source of 14m @ 1.06% Pb, 2.32% Zn, 34.4 g/t Ag costean geochemistry

Results - 0 - 59m - Gordon Limestone moderately to intensely weathered. Minor galena and sphalerite disseminated in weathered limestone.

8 - 20 = 12m @ 2.0% Pb, 1.5% Zn, 48.4 g/t Ag

including 8m @ 2.4% Pb, 2.0% Zn, 64 g/t Ag

59 - 65.5 - Dundas Formation

DIM-84-8 59600N:67214E -45°/252°T 112m

Target - Source of 8m @ 1.35% Pb, 1.11% Zn, 19.6 g/t Ag

14m @ 1.36% Pb, 3.05% Zn, 16.6 g/t Ag costean geochemistry plus anomalous deep bedrock (Marlow) sampling

Results - 0 - 112m - Gordon Limestone variably weathered and dolomitized. Trace of coarse galena and sphalerite as slugs in weathered limestone.

37 - 38 = 1m @ 2.55% Pb, 5.32% Zn, 14 g/t Ag

49 - 51 = 2m @ 0.59% Pb, 1.27% Zn, 5.5 g/t Ag
59 - 60 = 1m @ 1.00% Pb, 0.065% Zn, 12 g/t Ag
60 - 61 = 1m @ 0.46% Pb, 2.05% Zn, 5 g/t Ag
100.5 - 102 = 1.5m @ 0.31% Pb, 1.15% Zn, 2 g/t Ag

DTM-84-9 59158N:67040E -60°/072°T (120m)

Target - Designed to test mineralized horizon intersected in DTM-84-2, 5, 6 at a vertical depth of 90m. Plannd total depth of hole is 200m

Results - 0 - 28m - Crotty Quartzite
28 - 120m Gordon Limestone intensely weathered at top of sequence (28-48m) which includes a zone of 5-10% galena-sphalerite in a coarse dolomite-siderite host (36.5-45.5m) with fresh variably bedded and slumped slightly fossiliferous limestone. Proposed target depth is 120-130m

Bannockburn Grid

DTB-84-1/1A 56900N:65699E -50°/091°T 212.7m

Target - Source of 26m @ 1.8% Pb, 0.8% Zn, 10.8 g/t Ag costean geochemistry

Results - 0 - 69m - Crotty Quartzite
69 - 212.7m - Gordon Limestone
Trace galena and sphalerite in heavily dolomitized limestone. No significant assay results.

DTSC-84-1 57781N:65388E -45°/040°T 70.0m

Target - Source of 22m @ 3.1% Pb, 3.9% Zn, 34.3 g/t Ag costean geochemistry

Results - 0 - 70m - Gordon Limestone
11 - 13m = 2m @ 0.8% Pb, 0.5% Zn, 25 g/t Ag
15 - 16m = 1m @ 0.6% Pb, 1.10% Zn, 4 g/t Ag
19 - 20m = 1m @ 0.01% Pb, 1.10% Zn, <1 g/t Ag
Mineralization occurs as disseminations of galena and sphalerite in a completly weathered limestone matrix. A cave fill deposit occurs at projected target depth.

DTSC-84-2 57807N:65356E -45°/030°T 70.2m

Target - Source of 14m @ 0.60% Pb, 1.25% Zn, 9 g/t Ag costean geochemistry. Intersect mineralized sedimentary breccia found in costean

Results - 0 - 70.2m - Gordon Limestone
No significant geochemistry. Cave fill deposits occur at projected target depth

DTSC-84-3 57800N:65870E -45°/091°T 72.1m

Target - To test under old workings at 57800N-67915E

Results - 0 - 43m - Crotty Quartzite
43- 72.1m- Gordon Limestone - variably weathered and silicified. Minor galena occurs in clays associated with quartz vein fragments.
52 - 64 = 12m @ 2.1% Pb, 0.3% Zn, 25.8 g/t Ag

DTSC-84-4 57910N:65620E -45°/215°T 105m

Target - Test under old Sunny Corner workings

Results - 0 - 46m - Crotty Quartzite
46 - 105m - Gordon Limestone variably weathered, strongly dolomitized with trace to minor galena and sphalerite in dolomitic vugs and veins. Assays are pending

DTSC-84-5 58070N:65387E -45°/222°T 54m

Target - Source of anomalous costean geochemistry (6m @ 3.64% Pb, 0.46% Zn, 6 g/t Ag) and extensive ironstone. Planned depth of hole is 150m

Results - 0 - 44m - Crotty Quartzite
44 - 54m - Gordon Limestone highly weathered throughout. Trace galena

Petrology

Fourteen core and costean samples have been submitted to Minpet Services in Sydney for thin and polished section descriptions.

Proposed Program

APPENDIX 6.2 A note on exploration at Mariposa

The concordant mineralization at Mariposa is lead rich, Pb/Zn approximately 3:1 (North Broken Hill, data), and was probably formed syn-diagenetically as a sulphide mud in carbonate units deposited under shallow marine conditions as indicated by algal mats, bioclastic facies, lagoon facies etc.. Tuffaceous units indicate contemporary volcanism, and chaotic breccias suggest the possibility of penecontemporaneous fault activity. Variably hypersaline conditions produced barite deposits now observed in drill core as barite paleomorph horizons.

Sideriteisation of both volcanic and limestone units at Mariposa may indicate reasonably close proximity to exhalative vents.

The parallel between the Mariposa environment and those of other Pb-Zn-Ag-barite deposits have already been noted in Amoco reports, and details are well documented. In the context of the popular model, the Mariposa banded sulphides may have formed fairly close, e.g. within 500m, of the exhalative vent which may have been situated on one of the neighbouring regional faults.

Thus a more economically attractive zinc rich facies of the Mariposa mineralization could occur down dip from the concordant lead rich sulphides.

In practical terms it is not known whether the depositional trend at Mariposa is up or down dip, or even along strike. However, the down dip extension of the Mariposa concordant sulphides has not been closed off by drilling. This seems to be a useful drilling objective which would also provide some data on the primary metal zoning and basin geology which would assist in the interpret-ation of geophysical anomalies.

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APPENDIX 9

LEAD ISOTOPIC COMPOSITION OF FIVE PROSPECTS IN THE GORDON LIMESTONE, WESTERN TASMANIA

by CSIRO

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CONFIDENTIAL

REPORT

to

AMOCO MINERALS AUSTRALIA COMPANY

on

THE LEAD ISOTOPIC COMPOSITION

of

FIVE PROSPECTS IN THE GORDON LIMESTONE, WESTERN TASMANIA

By GRAHAM R. CARR

15/2/85

1. AIM OF STUDY

The aim of this study was to determine whether the prospects at Mariposa East and West, Sunny Corner, Bannockburn and Black Jack could be ranked according to their lead isotopic similarity to the known mineralization in the area (Oceana and Rosebery) and thus to assign priorities for further exploration.

In particular the following questions were asked.

1. Does the Mariposa West mineralization have the same isotopic composition as the Oceana reference and can this be discriminated from the Mariposa East prospect where no significant mineralization was encountered during drilling?

2. Could prospects such as Mariposa East and Black Jack, in which sulfides occur in black muds resulting from the weathering of limestone, represent recent near surface deposition of sulfides in low Eh bog environments?

2. SAMPLES

Thirteen diamond drill core and sulfide-rich surface samples from the four prospects were analysed for lead isotopes (Table 1). An additional surface sample from the Oceana mine area was also analysed. All samples either contained galena or were high lead mixed sulfides.

3. REFERENCE SIGNATURES

The reference data used here are from the Oceana and Rosebery deposits. The Oceana reference was compiled from 6 samples previously analysed together with the single sample collected during this study. Four of the previous 6 samples were re-analysed and the results are presented in Table 2 and Figures 1 and 2. All except ZC-91 are reproduced to within the analytical precision of the method. For ZC-91 the repeat analysis is

accepted in place of the original analysis which showed the effects of fractionation during the Mass Spectrometer run.

4. RESULTS

The results have been plotted on two XY diagrams which have as their axes the lead isotope ratios $^{207}Pb/^{206}Pb$ vs $^{204}Pb/^{206}Pb$ and $^{208}Pb/^{206}Pb$ vs $^{207}Pb/^{206}Pb$ (Figures 3 and 4). Error bars in the top left hand corner of the diagrams indicate the analytical precision. In this section and in the Discussion section, this precision estimate is used when considering significant differences between data groups.

On both plots the Mariposa East data form extremely homogeneous groups more radiogenic than the reference fields. In the case of the $^{208}Pb/^{206}Pb$ vs $^{207}Pb/^{206}Pb$ plot, the data are significantly different from the reference fields. The Mariposa West data overlaps the Mariposa East data but is less homogeneous. The two Sunny Corner samples have similar ratios and are close to the Oceana reference. The single Bannockburn sample is similar to the Oceana reference but significantly less radiogenic than any of the other samples analysed. The single Black Jack sample is the most radiogenic of all and and is significantly different to both reference fields on both diagrams.

5. DISCUSSION

The results for the Gordon Limestone prospects indicate that the lead isotopic ratios fall close to the overall range of values expected for Cambrian Massive Sulfide deposits and Ordovician carbonate hosted deposits of the Oceana type, but are dissimilar to the younger vein style mineralization such as at Queen Hill and Mount Farrell. The results do not preclude the possibility that the lead in the bog associated prospects such as Mariposa East and Black Jack was deposited in recent times by in

situ crystallization of sulfide minerals, but such lead must have derived principally from the weathering of Oceana/Rosebery style mineralization.

Studies of a major carbonated hosted environment in Australia (but not of the Irish Style) shows that large ore accumulations have an homogeneous signature indicative of a major brine system. Related, but generally older or younger low tonnage mineralization, is associated with heterogeneous lead isotopic ratios which can vary systematically with respect to age and structural association. This variation can be readily explained by a wide range in the age and thus the lead isotopic composition of the probable source rocks for the mineralization. In the Gordon Limestone environment there probably is not the same range in age or lead isotopic compositions of the basement rocks and so we would expect less variation in the lead isotopic composition of the brines leaching lead from different levels of the basement at different times.

However it is likely that low tonnage mineralization related to the waxing or waning stages of a circulating brine system, with possible associated mixing of a number of minor lead sources, would have slightly different and probably less homogeneous lead isotopic compositions to the main mineralization.

If as a model we are prepared to say that the main mineralizing event in the region resulted in the deposition of Oceana, then other large accumulations of base metals produced in the same event (for example from adjacent large circulating brine systems several km apart) would have the same lead isotopic signature. Thus the mineralization at Black Jack, Mariposa East and probably Mariposa West should be relegated to low priority in

an exploration sense because they are not directly related to this major mineralizing event. The Bannockburn and Sunny Corner prospects are not fully tested, and at this stage cannot be shown to be different from the Oceana reference.

6. CONCLUSIONS

1. Lead isotopic compositions of the single sample from the Black Jack deposit indicate it is not closely related to the Oceana mineralization and should be given the lowest priority for further exploration.

2. No differences can be seen between the Mariposa East and Mariposa West mineralization based on lead isotopes and with the exception of possibly one sample , both plot outside the Oceana reference. Thus both should be given a low priority for further exploration, although higher than for Black Jack.

3. At this stage the Sunny Corner and Bannockburn mineralization cannot be discriminated from the Oceana reference. However, further analyses would be required before more definite statements could be made.

Table 1 Descriptions of samples used in this study.

Sample No	Prospect Name	Grid Ref	DDH	Sample Type	Sample Analysed
S6	Oceana	-	-	Ore o/c	Gl-rich ore
S7	Black Jack	60825,67310	-	Costean	Spl-rich,weath lst
S8	Mariposa-E	58800,67320	-	"	Gl in weath lst
S9	"	59400,67360	-	"	"
S9	"	"	-	"	Spl in weath lst
S9	"	"	-	"	Py in weath lst
S10	"	59200,67360	-	"	Gl in mass sulfide
S11	"	-	DTM-84-3	Drill core	Gl in core
S12	"	-	DTM-84-4	"	"
S13	"	-	DTM-84-7	"	"
S14	Mariposa-W	-	DTM-84-2	"	"
S15	"	-	DTM-84-5	"	"
S16	"	-	DTM-84-9	"	"
S17	Sunny Corner	-	DTSC-84-5A	"	"
S18	"	-	-	Costean	Gl in mass sulfide
S19	Bannockburn	-	DTB-84-1A	Drill core	Gl in core

Table 2

OCEANA RESULTS

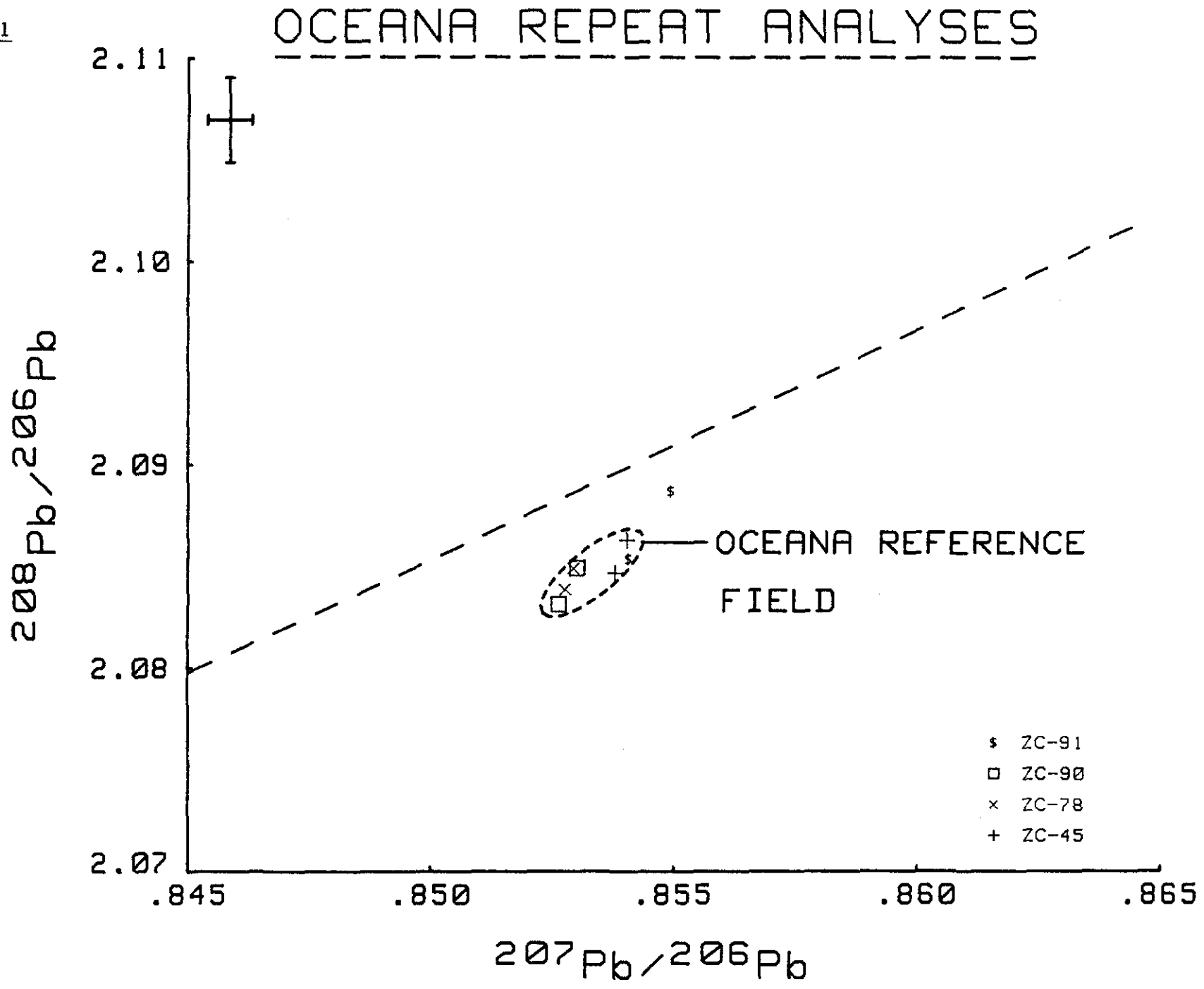
Sample	$\frac{208\ Pb}{206\ Pb}$	$\frac{207\ Pb}{206\ Pb}$	$\frac{206\ Pb}{204\ Pb}$	$\frac{207\ Pb}{204\ Pb}$	$\frac{208\ Pb}{204\ Pb}$	Pb(ppm)
ZC-45	2.0863	0.8540	18.286	15.617	38.150	
ZC-45REPEAT	2.0847	0.8538	18.283	15.610	38.114	
ZC-78	2.0849	0.8530	18.319	15.625	38.193	
ZC-78REPEAT	2.0839	0.8528	18.315	15.619	38.167	
ZC-79	2.0842	0.8536	18.277	15.601	38.092	
ZC-90	2.0849	0.8530	18.286	15.599	38.126	
ZC-90REPEAT	2.0831	0.8526	18.303	15.605	38.127	
ZC-91	2.0887	0.8549	18.273	15.623	38.167	
ZC-91REPEAT	2.0854	0.8541	18.282	15.614	38.125	
ZC-92	2.0842	0.8530	18.294	15.605	38.128	
SG	2.0839	0.8533	18.283	15.601	38.100	

Table 3

GORDON LIMESTONE PROSPECTS

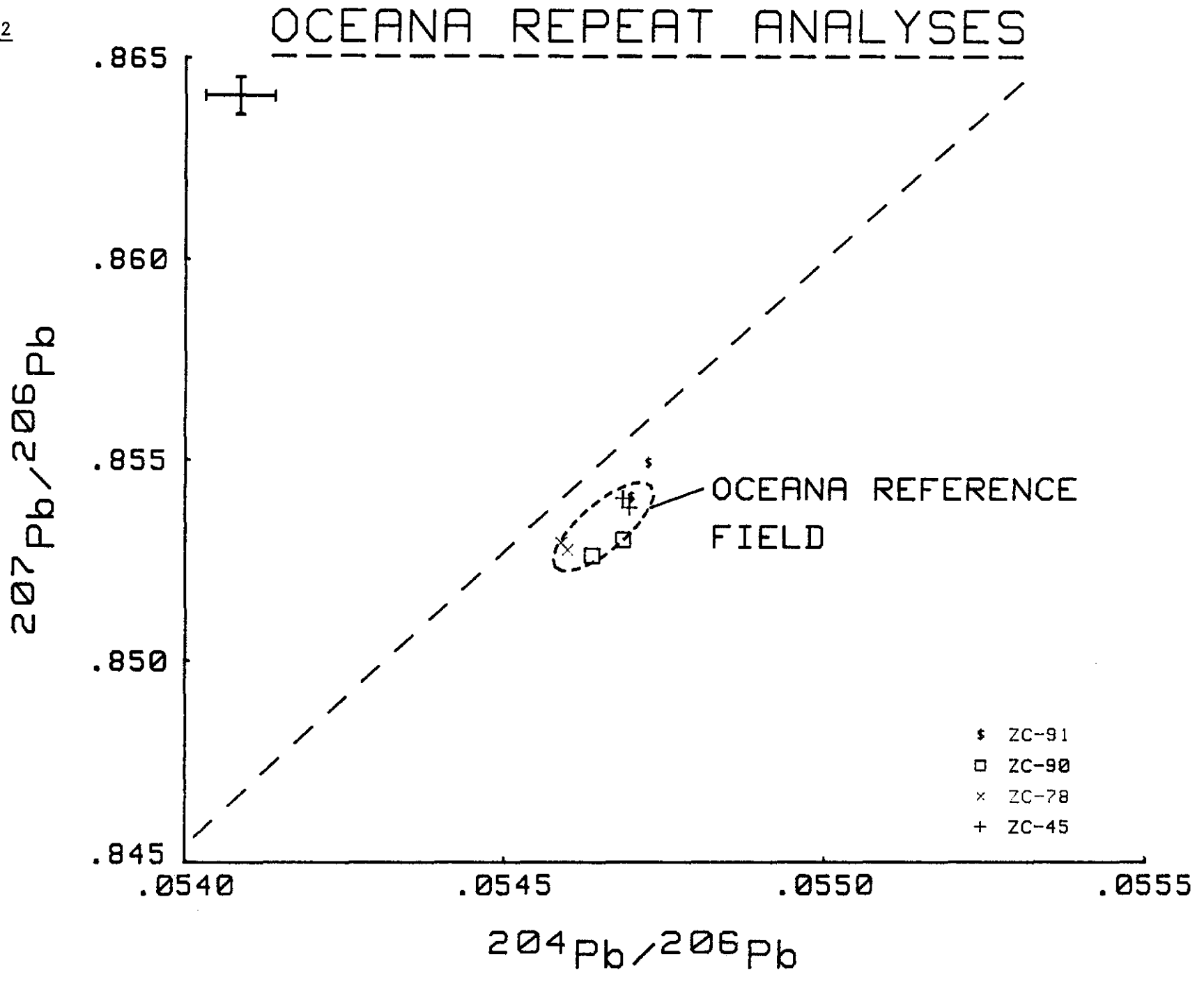
Sample	208 Pb / 206 Pb	207 Pb / 206 Pb	206 Pb / 204 Pb	207 Pb / 204 Pb	208 Pb / 204 Pb	Pb(ppm)
BLACK JACK						
S7	2.0811	0.8490	18.300	15.621	38.264	
MARIPOSA EAST-COSTEAN SAMPLES						
S8	2.0812	0.8507	18.350	15.610	38.189	
S9/1	2.0801	0.8504	18.344	15.599	38.157	
S9/2	2.0802	0.8504	18.347	15.602	38.164	
S9/3	2.0800	0.8505	18.341	15.598	38.148	
MARIPOSA EAST-BEDROCK + DRILL CORE						
S10	2.0807	0.8503	18.340	15.595	38.161	
S11	2.0809	0.8508	18.343	15.605	38.170	
S12	2.0803	0.8506	18.337	15.598	38.147	
S13	2.0805	0.8500	18.352	15.598	38.181	
MARIPOSA WEST-DRILL CORE						
S14	2.0821	0.8518	18.312	15.598	38.127	
S15	2.0830	0.8512	18.355	15.624	38.234	
S15 ReED	2.0810	0.8512	18.325	15.598	38.134	
S16	2.0806	0.8508	18.334	15.598	38.146	
SUNNY CORNER						
S17	2.0826	0.8515	18.333	15.610	38.179	
S18	2.0833	0.8524	18.305	15.604	38.136	
BANNOCKBURN						
S19	2.0868	0.8549	18.250	15.602	38.084	

igure 1



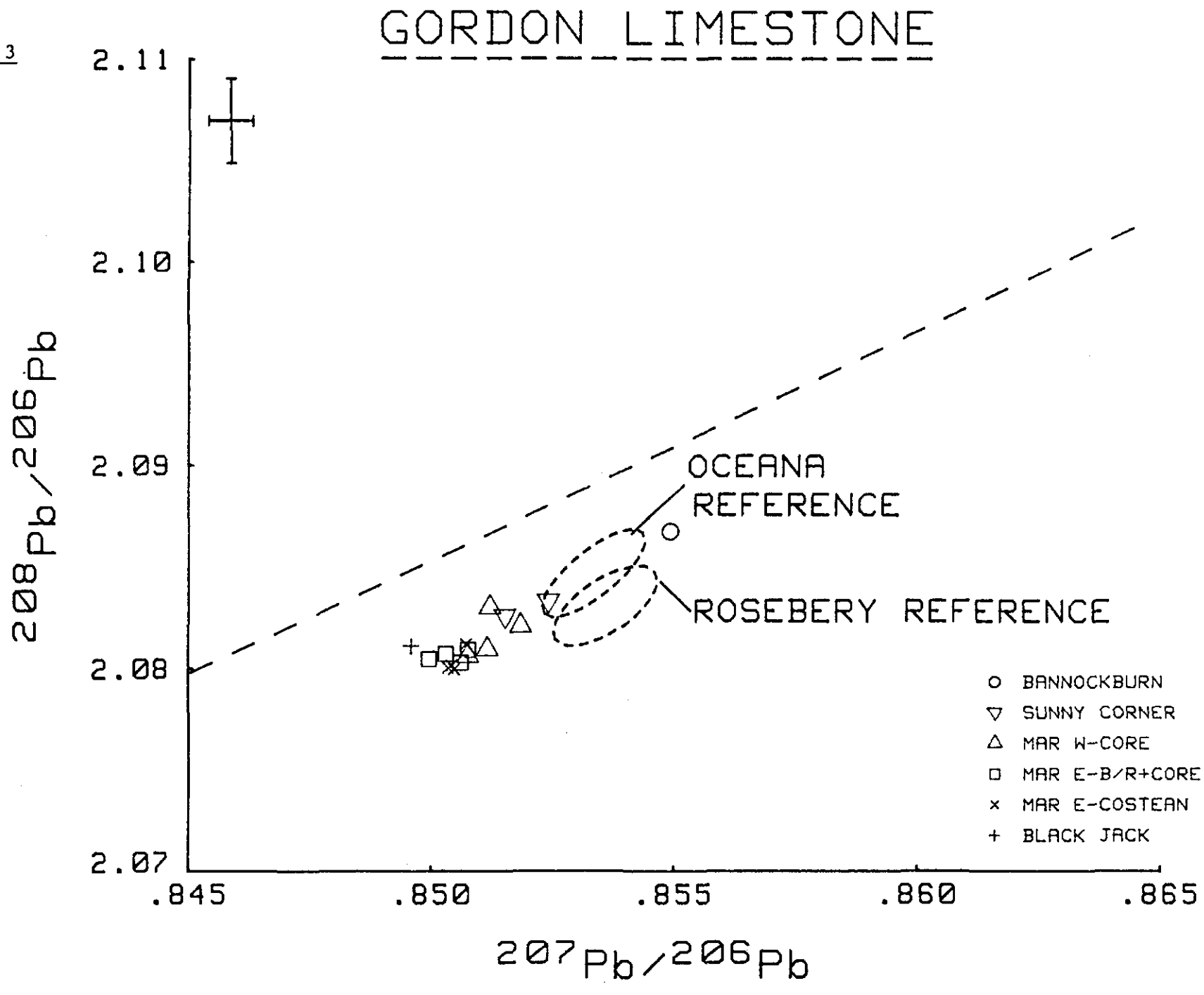
1153691

igure 2



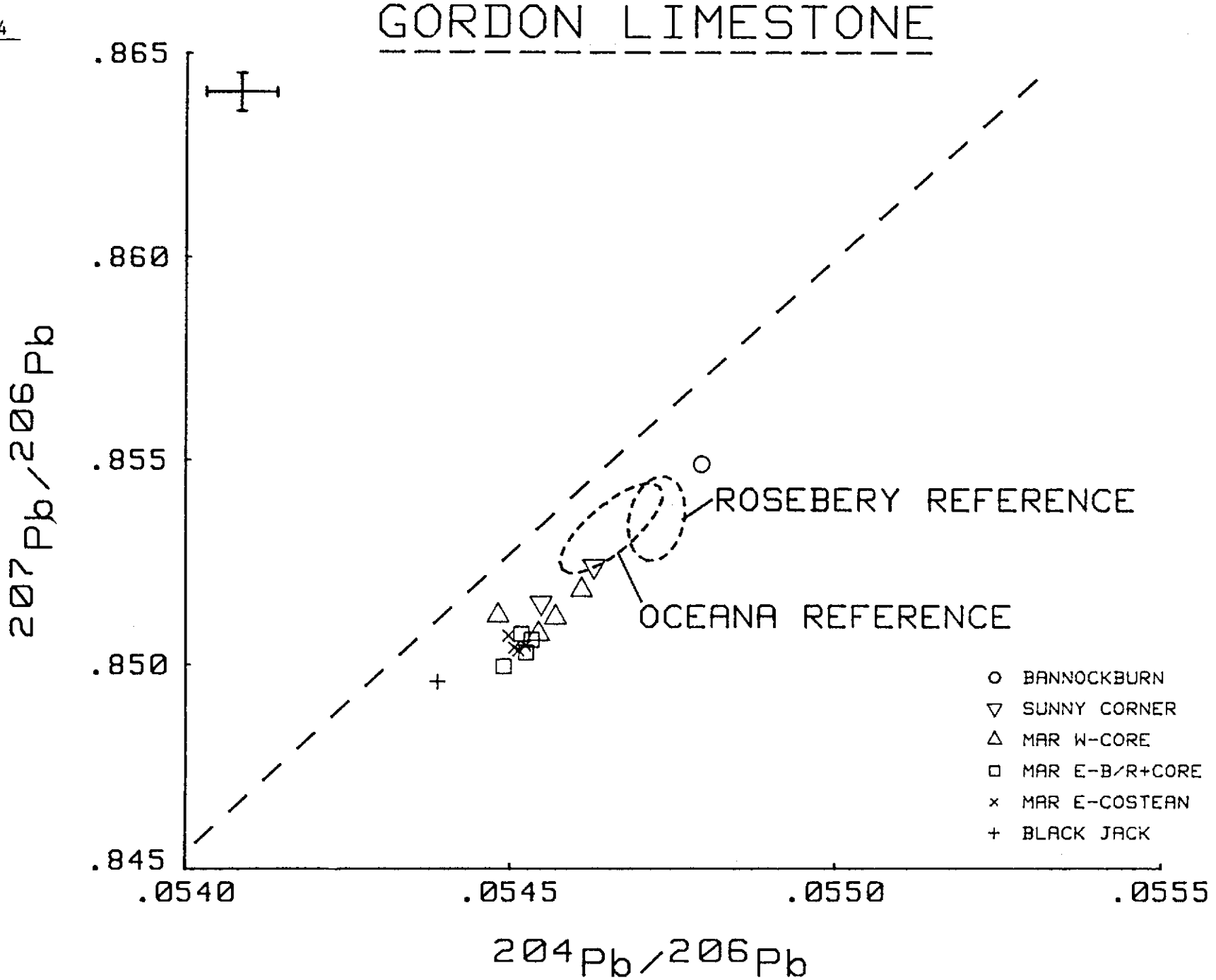
115368

gure 3



115369

gure 4


GORDON LIMESTONE
.865
.860
.855
.850
.845
.0540
.0545
.0550
.0555
$^{207}Pb/^{206}Pb$
$^{204}Pb/^{206}Pb$
ROSEBERY REFERENCE
OCEANA REFERENCE
BANNOCKBURN
SUNNY CORNER
MAR W-CORE
MAR E-B/R+CORE
MAR E-COSTEAN
BLACK JACK

11530

115371

APPENDIX 10

PETROGRAPHIC AND MINERAGRAPHIC REPORTS
by Minpet Services

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115372

MINPET SERVICES

659 Botany Road
ROSEBERY, N.S.W.

REPORT NO. 59/84

DRILL CORE AND ROCK SAMPLES FOR MINERAGRAPHIC AND PETROGRAPHIC INVESTIGATION

(prepared for Mr. G. Kary,
Amoco Minerals Australia Co.,
Zeehan, Tasmania)

September 1984

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3.	SUMMARY/DISCUSSION	3
4.	DESCRIPTIVE PETROGRAPHY	8
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I LETTER FROM MR. G. KARY, AMOCO MINERALS AUST. CO. TP P.J. CURTIS, MINPET SERVICES

II SUBMISSION SHEETS FOR SPECIMEN NUMBERS 113951 TO 113964 INCLUSIVE

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115374

1. INTRODUCTION

With only a few days to study the sections to beat the 18th September deadline, possibly insufficient time was available to give any depth to this study. So I have done the best possible and hope that the study may be continued and successully completed with the availability of more material.

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2. METHOD

Polished sections, polished thin sections and thin sections of 14 specimens were studied petrographically and mineragraphically. Drill core sections were stained using the ferricyanide method of Dickson to differentiate types of calcite and dolomite and the method of S. St. J. Warne for differentiating between dolomite and siderite.

3. SUMMARY/DISCUSSION

.. 113951

A dolomitised calcareous sediment shows collapse structures formed during dolomitisation. Cavities were filled by vein type coarse dolomite plates associated with reconstituted framboid pyrite and traces of galena. The pyrite growth continued into the dolomite groundmass where fine reconstituted framboidal forms occur in the dolomite. Sulphide mineralisation is mobilised syndiagenetic (Ref. 1) with calcarenite. No graphitic laminae were definitely identifiable. In view of an association with some clastic quartz of similar size, dolomitisation probably shows a primary calcarenite texture.

.. 113952

Dolomitised calcarenite with a sericite matrix. The grain size variation is similar to that in 113951 with the addition of the sericitic matrix. There also occurs an abundance of subangular clastic quartz (silt to very fine sand size). Slumping of beds was probably caused by dolomitisation. It is not certain if this was syndiagenetic or an anadiagenetic alteration but likely the former to explain the minor compaction type slump forms with clastics other than carbonate, migrating into fissures. Iron oxides and traces of organics migrated to fractures formed during dolomitisation. Pyrite subsequently formed in these fractures.

.. 113953

Calcarenite or calcareous mud, dolomitised and slumped, intermixed with non-dolomitised bryazoan forms. The dolomite crystals filled open opercules of the bryazoa with no concurrent dolomitisation. Two environments of formation; dynamic for the dolarenite (ex calcarenite), much quieter for fossils (accumulated in reefs). No sulphide fragments. No evidence of syndepositional faulting is seen.

.. 113954

Sulphide breccia. A fine grained dolomite·sphalerite

sedimentary and vein breccia contains broad networks of interstitial calcite with sphalerite. The sulphides are associated as fine intergrowths with dolomitised sediment. Otherwise mainly with calcite vein as large fragments.

.. 113955

Slumped calcite:dolomite lenticles. The dolomite occurs as fine rhombs and breccia in breccia zones. Calcite is present mainly as fossil forms of bryazoa and crinoid fragments. After consolidation there is evidence that tectonic forces caused brecciation of dolomite. This occurred in limited shear zones and affected the fossil structures in neighbouring calcite lenticles for small thicknesses only. Low energy slump was followed by tectonic brecciation and shear along narrow zones.

.. 113956

Mainly siderite and dolomite. Narrow dolomite 'veins' cut the siderite mosaics and join a colloform style of clear dolomite showing crustification growth in leached cavities. Pyrite occurs within the siderite and is possibly early diagenetic. Coarser sphalerite is in dolomite vein and is plainly epigenetic. An association with calcite-replaced baryte laths is seen. Contact between siderite and dolomite veins is sharp.

.. 113957

Siderite breccia with 'cavity' spaces which are filled by crustiform dolomite. The siderite breccia contains sphalerite which is also fragmented. Calcite vein cuts all structures. Galena and sphalerite are present as mutual growths in dolomite veining. Massive sphalerite - at one side of section adjoins crustiform dolomite but shows no colloform textures, only brecciation and narrow ferruginous growth zones. Sphalerite elsewhere accompanies colloform dolomite, but is not itself colloform.

.. 113958

Sulphides are associated with dolomite and later baryte.

There is present a very distinct plain diagenetic type sulphide growth with what appears to be a colloform intergrowth. The 'vug' is margined by baryte and calcite veins. Sphalerite as aggregates occur abundantly within dolomite interstices suggesting a syndiagenetic origin. Baryte as stellate growths and single growths is common in the dolomite. Veins are really identifiable only as later calcite and local baryte.

.. 113959

Fine grained equigranular dolomite as fragments in an essentially colloform dolomite:baryte:sulphides:calcite fracture fill. The coarser dolomite shows crustiform growth zones. Some brecciation and recrystallisation is evident for all phases, including calcite, locally. Vein breccia or dedolomitisation? It is noted that barium sulphate is a commonly precipitated mineral in Mississippi Valley style mineralisation. One silver mineral occurs as inclusions in galena - possible matildite ($AgBiS_2$), otherwise silver is contained in galena as silver sulphide in solid solution.

.. 113960

Sulphide penetrated siderite breccia as pyrite, sphalerite and galena veins. Paragenesis is pyrite → sphalerite → galena. Pyrite and sphalerite are the only observable vein forms.

.. 113961

Dolomitised ~~oolithic~~ Psolitic limestone. ~~Oolites~~ Psolites (~~~0.8 mm~~ 8 mm) with interstitial calcite matrix which contains fine trails of pyrite. No micritic calcite mineral relicts are noted in matrix. Oolites are dolomitised; matrix is calcite. Fine grained calcite laths and recrystallised carbonate fragments are present at centres of ooliths.

.. 113962

Colloform precipitation of colloform pyrite, replaced by sphalerite and galena. Early pyrite was syndiagenetic, and was largely replaced by later sphalerite and galena

(brine solutions advancing along fractures). Signs of tectonism indicate this could be related to a fault system. Traces of arsenopyrite occur. Sulphide precipitation is indicated by the presence of minute pyrite framboids. Precipitation of sphalerite occurs around siderite.

.. 113963

Banded sphalerite, galena, baryte rock. Presence of baryte sugests sulphides were precipitated from saline solutions. A weak colloform structure indicates cavity fill. Later baryte was strongly silicified. Section shows regular bedding in part and cavity fill at opposite end.

.. 113964

Slumped mud with scattered quartz and baryte fragments. Contains sheared out layers of paper shale, some of which show strong shear. In-situ brecciation of cherty quartz layers. Tectonic overprint on slump breccia. Lagoonal sediment.

Search of the literature indicated, (Ref 2), many parallels of mineralogy, textures, etc. with the Silvermines, Eire type as per the Upper G zone with massive galena (113960) and pyrite and sphalerite vein; disseminated breccia ore (113954). Also with a pyrite (marcasite), sphalerite and galena association. Sulphide muds were identifiable as such only in 113963 and tetrahedrite was not seen. By far the most ore is present as crustiform growths, particularly towards the bottom of the sequence (113959, 113962 and 113963) and baryte occurs in rosette forms in carbonate (113958). Sedimentary brecciation with an overprint of tectonic brecciation is shown in 113955 and 113964. Brecciation is syndepositional or post-depositional. Sulphide precipitation is syndiagenetic rather than syngenetic. The problem with carbonate hosts is that carbonate recrystallisation and easy mobilisation of sulphides makes syngenetic sulphide paragenesis almost impossible to determine. However, framboids of pyrite are present in 113962 associated with crustiform precipitation of sulphides. Whether cavity forming was due to dolomitisation or leaching solubilisation is difficult to

determine but the crustiform associations are commonly associated with dolomite breccia forms. The presence of an adjoining fault system may be indicated by the superimposed tectonic brecciation observed (as above 113955 and 113964) though these are not actual fault breccias.

The more recent paper by Stewart Taylor and an earlier paper by the same author in the London I.M.M. Transactions, 1978, give an excellent account of mineralisation, stratigraphy, ore controls, etc. at Silvermines, Eire, which appear to indicate very similar environmental conditions to those shown by the currently discussed drill core specimens. The current deposits contain facets of both upper and lower zones including epigenetic discordant precipitation and syndiagenetic zones. This may represent a telescoping or superimposition of mineralisation events. There is present slumping, periodic tectonism, varying degrees of brecciation and an unstable depositional environment.

More time would have to be spent on the current provided sections and examination of other specimens from the area would have to be scanned to obtain a completely clear picture and also a more detailed comparison with other areas.

Comparison with Mississippi Valley type deposits by simply studying polished sections is impossible since there are so many textural similarities between Silvermines and M.V. type (Neil Williams - personal communication).

4. DESCRIPTIVE PETROGRAPHY

Sample No. 113951/MPS 3311

Field Name: Dolomitised limestone.

Petrographic Description: Dolomitic sediment (dolomitised calcarenite) shows brecciation was probably caused by cavity formation during dolomitisation(?). Cavities were filled by coarser dolomite plates associated with massive pyrite.

Mineralogy:	Vol.%
Ferroan dolomite	10
Dolomite	87
Quartz	<1
Pyrite	3
Galena	<1
Rutile	<1

Texture: An even fine grained dolomite of euhedral > subhedral rhombic grains (0.08 to 0.3 mm, but mainly around 0.1 mm) forming close mosaics but containing some fine iron oxide cement between grains. The main mass of dolomite did not stain with potassium ferricyanide but a coarser grained dolomite present coloured a deep turquoise blue. The latter is clear ferroan dolomite mainly around 0.6 to 0.8 mm forming mosaics and occupying cavities to 3 mm wide in networks and containing pyrite aggregates 0.5 to 0.8 mm wide within the ferroan dolomite material or marginal between finer dolomite of sediment and coarser ferroan dolomite of vein material. Finer pyrite ($\sim$ 0.02 mm and greater) forms trains within narrow vein systems (0.1 mm wide) between fragments of the earlier dolomite. In places the pyrite forms glomeroblastic masses (1.6 mm wide) containing inclusions of ferroan dolomite; all within or marginal to cavity fill. Occasional quartz clasts similar in size to neighbouring dolomite grains are contained within the 'calcarenite' dolomite mosaics.

No graphitic laminae were definitely identifiable in this section.

Alteration: Dolomitisation of calcarenite, (anadiagenetic since percolating connate solutions contained sulphur as well as iron?). Cavities formed during conversion to dolomite were filled with ferroan dolomite precipitated from solution.

Sample No. 113952/MPS 3312

Field Name: Argillaceous dolomite.

Petrographic Description: Dolomitised calcarenite with a sericitic or illitic, chert interstices. Slumping was possibly caused by dolomitisation, i.e. syndiagenetic alteration followed by slumping. See 113951. Much of the clastic quartz appears to have migrated into fractures during dolomitisation.

Mineralogy	Vol.%
Dolomite	42
Ferroan dolomite	20
Iron oxides	2
Pyrite (with marcasite)	2
Sericite	15
Chert	7
Quartz	12

Texture: Section consists of a network of fine anhedral quartz (0.02 to 0.08 mm), with interstitial fine sericite intermixed with very fine cherty quartz in aggregates. Fine blebs (0.002 to 0.006 mm and in aggregates) forms fine laminae in the sericite:chert interstices. The main mineral consists of rhombs of dolomite (0.05 to 0.4 mm, but largely median size of 0.1 mm); most grains are zoned and euhedral though many subhedral grains occur. Dolomite grains contain zones of pure dolomite cores with thin intermediate concentric zones of ferroan dolomite and an outer zone (to matrix) of ferroan dolomite showing instability of chemical conditions during dolomitisation. Fine dolomite mud is intermixed with the interstitial silt quartz and sericite. Quartz as larger grains (0.05 to 0.1 mm) are subhedral and with the dolomite form a silty very fine sandy clastic material. Therefore sediment is an original calcarenite with abundant clay matrix. Chert could be silicified carbonate mud and fine iron oxides and under the stereomicroscope appear graphitic (no polished section was prepared). Similarly there is evidence of slumping as shown by the stained block Possibly

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115384

slumping was caused during dolomitisation (syndiagenetic); later formed the fine grains of pyrite (± marcasite) as seen in the interstices. The form of slumping appears as parallel laminae (several mms thickness and length) with more dense interstitial finer sericitic material. Laminae are aligned 45° to core axis.

Alteration: Syndiagenetic dolomitisation of silty, sericitic calcarenite includes minor chertification. Pyrite formed after migration of iron oxides (± organics) to slump 'fractures'.

Sample No. 113953/MPS 3313

Field Name: Chaotic fragmented fossil breccia.

Petrographic Description: Fine calcarenite slumped sediment with dumped bryazoa and some brachipod fragments. The host sediment alone shows dolomitisation, leaving the fossil forms as ferroan calcite. Mixing took place after dolomitisation since rhombs of dolomite fill opercules of calcitic bryazoa.

Mineralogy:	Vol.%
Calcite	30
Dolomite	58
Ferroan dolomite	7
Quartz/chert	3
Iron oxides	2

Texture: Fragments of carbonatised bryazoa and possible bivalves (brachipods) remain calcite or are partly silicified to chert, occur to 20 x 7 mm. Fenestralline and Archidemedes forms are well preserved mixed with some small brachipod sections in a groundmass of fine calcite mud and calcite breccia now recrystallised. Silicification to chert and chalcedony is patchy showing replacement of fossil forms. Silicification solutions migrated along fractures between calcite fossil forms and the dolomitic matrix. Some localised dolomitisation of fossil forms is seen but it is quite limited to fractures between the calcite altered forms and includes some interstitial iron oxide (+ graphite?) debris. The groundmass entrapping the calcite fossils is similar to that of 113952 as rhombs of dolomite (0.05 to 0.18 mm but mainly around 0.08 mm) and contain a thin interstice of recrystallised ferroan dolomite mud or breccia and similar size chert fragments. Many dolomite crystals have a fine encapsulating shell of ferroan dolomite.

The calcite fossils contain perfect dolomite euhedra for instance, filling the peristome cavities of Fenestralline bryazoa but there are massive bryazoa fronds that are

simply pure calcite. Dolomitisation of calcarenite took place before slumping and intermixture of calcite fossil forms.

Brecciation was syndepositional. There is no evidence of sulphide fragments here, though obviously fluids did permeate fine iron oxide filled fractures (?) within the original sediment to dolomitise the calcite mud or arenite. The regularity of dolomite crystal size suggests a calcarenite probably a high energy environment, yet many bryazoa fossil forms are well preserved. However, there are an abundance of fragments intermixed with the dolomite of very fine sand size.

A moderate to low energy environment of deposition.

Alteration: Dolomitisation of fine sandy calcite (including mud).

Metamorphism: Brecciation occurred prior to or during slumping.

Sample No. 113954/MPS 3314

Field Name: Calcite veins, minor sphalerite.

Petrographic Description: A fine grained dolomite:sphalerite sedimentary breccia with networks of broad irregular calcite containing coarse sphalerite. One large dolomite fragment contains bryazoa forms part-replaced by calcite. Dolomitised sediment contain sphalerite as fine growths.

Mineralogy (vol.%)	Zones* (a)	(b)
Ferroan dolomite	92	30
Calcite	5	53
Sphalerite	2	15
Iron oxides	1	2
Quartz	-	<1

* (a) host; (b) vein.

Texture: A broad calcite vein (+45 mm wide) entered a fracture in dolomite carrying sphalerite and dolomite fragments in a sedimentary breccia.

Zone (a). This is covered by the extreme limits of the thin section and consists of fine dolomite rhombs (0.03 to 0.12 mm, median size 0.08 mm) and crystals more irregular in size but commonly perfect rhombs. Each rhomb has a narrow periphery of ferroan dolomite. The dolomite contains inclusions of calcite (2 x 1 mm, 4 x 1.5 mm) that are not vein but bryazoan forms replaced by very fine subhedral calcite containing interstitial specks (0.005 mm) of iron oxides but which was subsequently traversed by fine veins (0.16 mm wide) of fairly even calcite containing some black laminae (graphite?) interlaminated with calcite. Where the host dolarenite (ex-calcarenite) borders the vein material there occurs a narrow strongly ferroan dolomite contact.

Zone (b). The vein and main part of the section consists of mosaics of broad (to 2 x 1.6 mm) anhedral calcite plates down

to patchy fine calcite (~ 0.3 mm) where there is an abundance of dolomite (host rock) fragments and coarse sphalerite fragments associated with the calcite. The host is as Zone (a) above, occurring as lenticular fragments (2 x 0.8 mm, 0.6 mm) broken off from the dolomite sediment, the elongate fragments trending with the calcite vein are some of the smaller fragments. Yet other fragments (~ 3 mm) are of a fossiliferous non-vein calcite and some of these contain growths of sphalerite (0.8 mm). Sphalerite fragments are a pale, low iron variety, mottled yellow, show characteristic dodecahedral cleavage and are completely isotropic. Occas-ionally grains are attached to goethitised magnetite forms. Size of fragments vary 0.04 to 4 x 3 mm and show no replacement by calcite. Several fragments of entrapped 'dolomite' are in fact anhedral calcite growths containing dolomite rhombs and sphalerite attachments; also includes cherty quartz and appears from the attack on dolomite to be partly dedolomitised material.

Alteration:

i) Dolomitised calcareous sediment (calcarenite?), contains calcite fossil forms (not dolomitised).

ii) Vein calcite (with sphalerite) with part dedolomitised carbonate host inclusions.

Metamorphism: -

Note: Contact of vein with dolomite (grey limestone) is sharp or shows a narrow selvage of dedolomitisation.

Sample No. 113955/MPS 3215

Field Name: Breccia - fossil and lithic fragments.

Petrographic Description: Slumped calcite:dolomite lenticles. Calcite contains fossil fragments and shows veining replacement of calcite mud and dolomite lenticles. Later tectonic brecciation was superimposed on the slump structures. Low energy environment. Brecciation was post depositional.

Mineralogy	Vol.%
Calcite	60
Dolomite	35
Ferroan dolomite	5
Tourmaline	<1
Pyrite	<1

Texture: Slump texture of calcite fragments containing bryazoan (fenestrate) fronds (10 x 5 mm, 15 x 4 mm) and a fragment containing echinoderm debris of stem plates, lunate crinoidal arm plates and crinoid calyx sections (0.5 to 2 x 0.3 mm) set in calcite 'mud' fragments (10 x 4 mm, 15 x 10 mm) and as individual crinoid pieces and limestone fragments (0.5 to several mms) embedded in dolomite. The dolomite (0.04 to 0.2 mm) is commonly present as perfect rhombs showing concentric zones of dolomite and ferruginous dolomite set in a matrix of dolomite breccia, laminae of calcite and fossil forms as described. There appear to be fine fissures filled by iron oxides and scattered pyrite grains (0.03 mm) intermixed with dolomite which shows a sharp contact with large calcite fragments that contain few scattered dolomite rhombs. Slump and consolidation was followed by brecciation and shear with breccia planes oriented about 30° to the core axis. The tectonic brecciation therefore cuts across slump folds in the dolomite and calcite zones. The answer to the problem as to why the fossiliferous fragments were not dolomitised is because the sediment is the result of slumping and mixing of different carbonates A complex mixture of dolomite

crystals, calcite fossil forms and calcite mud are the products of slumping. A trace of anhedral tourmaline occurs in the mud.

Alteration: The calcarenite was dolomitised before intermixing with calcite forms so that diagenesis was syndiagenetic in original zone of sedimentation.

Metamorphism: Planes of shear and brecciation are noted which post-dated slump but follow similar orientation planes.

Note: A low energy environment of deposition, shows slumping of dolomite and some intermixture of the dolomite and fossiliferous calcite:calcite mud phase. Followed by shear brecciation. There are no sulphide fragments or evidence of syndepositional faulting.

Sample No. 113956/MPS 3316

Field Name: Calcite and siderite veining in limestone.

Petrographic Description: A siderite mass of fine mosaics, shows veining by dolomite and locally by calcite. Scattered pyrite is seen throughout the carbonates but the sphalerite forms diagenetic aggregates that are precipitated in vugs or fractures now filled mainly by dolomite; locally shows calcite lining vugs. Leached siderite, cavities filled by colloform dolomite around vugs.

Mineralogy:	Vol.%
Dolomite	45
Siderite	43
Calcite	5
Illite	2
Pyrite	2
Sphalerite	3

Texture: Sediment consists largely of granular siderite as grains (0.015 to 0.1 mm, median size 0.08 mm), mainly subhedral but with some euhedral rhombs showing zoning. Many grains contain an abundance of fine iron oxide dust. Adjoining the broad siderite areas are coarse grains (0.12 to 0.5 mm) of clear rhombs of colloform dolomite. The grains are bound by curved crystal faces and together simulate radiate forms, patchily (2 mm radius), the rhombs have fused into a single crystal mass. The mass of dolomite then splits into veins (0.6 mm wide) that transect the siderite. The contact between the two carbonate minerals is sharp.

Pyrite as fine crystals (0.015 to 0.04 mm) are scattered throughout the siderite and dolomite although coarser grains tend to follow the dolomite vein.

Coarse sphalerite grains (0.2 x 0.2 to 0.5 mm) occur as aggregates in vein-like trends within the siderite. Altered

baryte laths (now calcite) prisms (~0.8 x 0.16 mm) follow the same vein forms.

Massive pyrite (~2 mm) and similar size sphalerite grains occur as a vein-like continuous segregation adjoining siderite situated on the edge of the main siderite mass but actually in fine grained (~0.08 mm) dolomite.

Calcite forms a broad zone (1.2 mm wide) around a vug (4 x 1.5 mm). Surrounded by a similarly broad concentric zone of coarse dolomite which backs on to siderite. One wedge-shaped ex-baryte form,now a void (1.2 x 0.3 mm) is situated within colloform dolomite,and voids of a similar shape are now filled with sphalerite. The 'vein' in siderite containing the sulphides is not now apparent and shows the ease with which carbonate recrystallises to obliterate earlier textures.

Elsewhere in the section, in dolomite, occur pyrite groups (0.12 to 0.6 mm) as rosettes and which are certainly diagenetic.

Therefore the section consists of a 'host' of siderite containing coarse dolomite and thin calcite veins.

Illite occurs as fine fibrous mineral as aggregates of inclusions in the interstices of the dolomite mass.

Alteration: Siderite alters to dolomite associated with iron oxide precipitation. Sulphides precipitate along vugs in both dolomite and siderite. Diagenetic (anadiagenesis).

A sharp colloform style of contact exists between dolomite and siderite.

115393

Sample No. 113957/MPS 3317

Field Name: Coarse galena and sphalerite in a calcite matrix, some 'vein' textures which are conformable to the bedding.

Petrographic Description: Siderite is present as breccia and contains sphalerite breccia fragments. The siderite is part replaced by less ferroan dolomite, a colloform variety and shows limited calcite veining. Galena and sphalerite as seen in polished section are present as mutual growths. Chalcopyrite is an exsolution product of sphalerite. Pyrite is replaced by galena.

Mineralogy:	Vol.%
Siderite	30
Dolomite	30
Calcite (vein)	10
Sphalerite	variable
Galena	"
Pyrite	<1
Chalcopyrite	<1
Illite	2

Texture: Consists mainly of siderite breccia and laminal relicts (to 10 x 5 mm), associated with similar size but mainly clear dolomite rhombs with faintly ferriferous centres and spotted with siderite relicts. Grains vary 0.005 to 0.07 x 0.05 mm with a median size 0.05 mm. Where cut by calcite veins and on either side of the veins (0.5, 0.6 mm wide), much of the siderite appears to be altered to fine anhedral calcite (and patchy dolomite?). Iron oxides have deposited between the crystals and in fine irregular fractures (0.015 to 0.03 mm wide) that cut across the siderite. Sharply in contact with the fine siderite and dolomite mosaics occurs cavity fill coarse (0.2 to 0.8 mm) mosaics of dolomite showing zoned colloform structures. Situated as lenticles within the siderite and fine dolomite are coarse lenticles of galena (2 mm wide) intergrown with the siderite/dolomite. Sulphide

has been brecciated and mobilised by broad cross-cutting calcite veins. In a zone of dolomite brecciation occurs an abundance of fracture-fill illite; also sulphide breccia fills narrow fractures in networks within the carbonate. In the broad calcite veins occur fine (0.015 mm) dolomite rhombs which are left as recrystallised relicts in the veins. Within the larger part of the section that consists of colloform dolomite growths which have filled a vuggy area of leached of siderite, also occurs massive vug filling sphalerite (15 x 10 mm), mainly pale yellow but with red coloured narrow iron-rich repetitive growth zones.

Alteration: Siderite was replaced by dolomite, then veined by calcite. Colloform dolomite has filled leach cavities accompanied by some vug filling sphalerite.

Metamorphism: Post-depositional brecciation with replacement sequence as per 'Alteration'.

Polished Section: In the polished section occurs massive galena containing as inclusions an abundance of massive carbonate; section shows both large irregular plates of calcite and aggregates of small rhombs of siderite and dolomite. Fractures between siderite aggregates contain trains of fine galena and dolomite margining the broad galena veins ($\sim$ 0.40 mm); dolomite contains an abundance of fine poikilitic galena. Similarly groups of dolomite/siderite crystals containing poikilitic galena are scattered throughout the broad galena replacement area. Where massive carbonate (3.5 mm wide) occurs, very few thin veinlets of galena penetrate.

Very pale sphalerite (0.04 x 0.04 mm) shows weakly sutured boundaries between adjoining sphalerite and galena but mainly shows mutual intergrowths within the galena mosaics. Deposited along the marginal contacts between sphalerite and galena are thin lenticles of sphalerite and dolomite and blebs of chalcopyrite occur within the sphalerite. Elsewhere, ovoid blebs (0.04, 0.07 mm) of chalcopyrite are scattered through the galena, and ovoid (0.05 mm) sphalerite in galena

itself contains a galena inclusion (0.02 mm). Residual, much corroded pyrite (0.08 x 0.03 mm) occurs as relict trails replaced by and situated within the galena.

Scattered fine pyrite crystals (0.01 to 0.03 mm) and aggregates (0.1 x 0.04 mm) are embedded in dolomite.

Other darker grey sphalerite grains (0.3 x 0.15 mm), embedded in galena are somewhat rounded and shows minor chalcopyrite exsolution.

Paragenesis of sulphides :- Pyrite → galena, sphalerite → chalcopyrite → mobilised sphalerite with dolomite vein.

Sample No. 113958/MPS 3318

Field Name: Galena-sphalerite in a carbonate host.

Petrographic Description: Ferroan dolomite (ex calcite?) sediment shows intergrowths with baryte and sphalerite (+ galena). Probable sequence was calcite to dolomite + baryte (diagenetic) → sphalerite (colloform - diagenetic).

Mineralogy:	Vol.%
Calcite	55
Ferroan dolomite	15
Baryte	20
Sphalerite	10
Quartz	<1

Texture: A narrow zone (3 to 4 mm wide) occurs diagonally across the thin section consisting of ferroan dolomite rhombs (~ 0.08 mm) in residual aggregates being replaced by ferroan calcite vein. Original intergrowths of baryte laths (to 1.2 x 0.2 mm) are now entirely pseudomorphed by calcite. Some radiate baryte intergrowths are also replaced by calcite. Residual patchy ferroan dolomite (or siderite) intergrown with sphalerite also occur in this zone.

Outside the dolomite zone are abundant baryte blades (0.2 x 0.005 mm to 1.2 x 0.08 mm) in radiating tufts that are scattered throughout the vein calcite of irregular plates (0.04 to 0.8 x 0.4 mm) in mosaics. The vein calcite is replacing both dolomite and baryte. Where calcite has not replaced the baryte, occur baryte intergrowths with granular (0.04 to 0.3 x 0.15 mm) sphalerite. Islands of galena: dolomite intergrowths occur within the broad calcite vein.

At one end of the section is a coarse 'knot' of prismatic baryte with included colloform sphalerite (structures of several mms), showing replacement of baryte by calcite. Original crystallisation was of dolomite:sulphides followed by baryte as low temperature diagenetic growths The

sphalerite is a very low iron variety (pale yellow). Post-depositional brecciation, particularly of the dolomite, was followed by calcite replacement.

The sulphide:dolomite crystallisation was diagenetic but there is no evidence of syngenetic mineralisation and since there is also no evidence of the nature of original sediment (dolomitised calcite, oolite?) a syndiagenetic origin cannot be postulated.

Occasional detritial quartz occurs as subangular unaltered grains (~ 0.3 mm) in both dolomite and calcite.

Polished Section: Cavity filling galena up to 3.5 x 2.0 mm shows marginal replacement by blebs of sphalerite and sphalerite forms lobate, ovoid and rounded grains and discontinuous veinlets within the section, and grain sizes vary from 0.002 to 0.2 x 0.1 mm throughout the section. Galena locally as solitary grains 0.002 mm or as mutual composites with sphalerite to 0.2 x 0.2 mm occur scattered throughout. The host is carbonate and both sulphides fill cavities in the carbonate and locally replace the carbonate along fractures.

The largest cavity is 8 x 6 mm contains a core of sphalerite and sphalerite:galena composites, also intergrowths of siderite, galena and sphalerite. A broad (+3 mm) margin to the cavity contains ribbon growths of sphalerite, sphalerite erite mantling galena in narrow cavities and similarly occur mutual composites of chalcopyrite (0.02 mm, 0.1 x 0.2 mm, 0.1 x 0.05 mm) with sphalerite which appears to be replacing chalcopyrite. One large grain of galena (0.5 x 0.6 mm) shows a mutual composite with a small grain of chalcopyrite in a cavity surrounded by dolomite crystals.

Sample No. 113959/MPS 3319

Field Name: Calcite-siderite with galena-sphalerite. Possible breccia.

Petrographic Description: Siderite breccia with crustiform dolomite and sulphides with baryte layers. Veined by calcite. Vein breccia type. Earlier in the sequence, siderite showed tectonic brecciation and shear of grains in fragments. Sedimentary brecciation was followed by vein fill and further brecciation. Silver minerals as such are rarely identifiable in galena but traces of matildite* ($Ag\ Bi\ S_2$) is seen; otherwise Ag is present in solid solution as Ag sulphide (Deer, Howie and Zussman). Silver and bismuth are better accommodated by galena formed at low temperature.

Mineralogy:	Vol.%
Siderite	10
Dolomite	36
Calcite	40
Galena	10
Sphalerite	4

Texture: The section shows successive crustiform layers of dolomite:sulphides and baryte around dolomite sediment fragments. At one end,section is extensively veined by calcite which contains baryte (0.5 x 4 x 3 mm). Within the succession is a band of unoriented coarse baryte (3 to 8 mm wide) and beneath this a 20 to 25 mm depth of crustiform dolomite. The sulphides also trend in the direction of banding, though just below the baryte band and within the dolomite.

The ferroan dolomite band (25 to 30 mm depth) contains sub-rounded fragments (15 x 12 mm and 5 x 4 mm) of mainly sheared siderite,seen to be rhombs around 0.1 mm size where not brecciated or sheared. There is an abundance of limonite between the grains and fragments are transected by thin calcite veins emanating from external calcite surrounding

the siderite fragment. Other fragments of siderite (0.3 x 0.3 mm) contain less limonite but are not sheared. Yet other 'clear' fragments show extensive brecciation of the carbonate. The surrounding calcite veining is of irregular but relatively larger grains. Many crustiform clear dolomite(?) shapes show some brecciation.

The brecciation shows up patchily with recrystallised fine fragments of rhombs and fractured rhombs. Extensive networks separating the dolomite are of clear anhedral calcite in mosaics. Sulphides occur within the siderite/dolomite masses. Sphalerite (0.14, 0.07 mm) shows as pale yellow grains containing few fine iron oxide(?) inclusions. Also elongate shapes (0.13 x 0.5 mm) of sphalerite as cavity fill show no continuity and no evidence of brecciation. Similarly for opaque galena. In the centre vein zone ($\sim$4 mm wide) there is evidence of fine galena breccia in dolomite breccia.

Just beneath the 'band' described above are fine to coarse prismatic (to several mms), intergrowths of baryte with interstitial siderite intermixed with replacement calcite. Possibly baryte was a vein form but the mineral shows replacement by carbonate.

Below the baryte is a deep zone (40 to 30 mm) of non-ferroan dolomite in a thin matrix of ferroan calcite. The ferroan dolomite is much brecciated and fractures are filled by sulphides. The sulphides are associated with ferroan dolomite and siderite rather than with the vein calcite.

Brecciation may have been caused by dedolomitisation of dolomite/siderite? Earlier tectonic brecciation of siderite in the 'upper' part of the section is certain.

Possible paragenesis:-

i) Siderite and dolomite 'sedimentary' bands.

ii) Dedolomitisation and reduction of siderite (siderite to dolomite); (dolomite to calcite).

iii) a) Baryte veins pass into cavities.

b) Sulphide (diagenetic) introduction along fractures or into cavities - colloform sphalerite is noted.

c) Calcite forms a replacement network.

d) Cavity fill by 'colloform' dolomite followed by sulphides along fractures.

Polished Section: Galena is present as fracture fill of perfect euhedral crystals and intergrowths with associated mutual sphalerite growths. Pyrite forms vein growths with calcite and other sulphides. Otherwise pyrite is present as very fine particles (0.005 mm and much less) as specks along interstices of carbonate grains. Scattered galena and mutual sphalerite occur as groups throughout (0.08, 0.15 mm) the calcite replacement veins. Several such intergrowths occur as mutual chalcopyrite:galena:sphalerite. Also sphalerite occurs throughout the carbonate as solitary grains (<0.01 to 0.1 mm). Pyrite aggregates (0.3 x 0.15 mm) contain a cement of sphalerite. Other areas show thin pyrite cement between carbonate breccia fragments and thin galena cement occurs between dolomite rhombs.

Sulphides are contemporaneous, and entered breccia channels from veins.

Sample No. 113960/MPS 3320 (Polished section only).

Field Name: Semi-massive galena.

Mineragraphic Description: Siderite occurs as aggregates of rhombohedra which show shear, brecciation and entry by pyrite, sphalerite and then by galena. Galena is very abundant in this section as a massive sulphide. Suggested paragenesis is i) pyrite; ii) sphalerite; and iii) galena.

Mineralogy:	Vol.%
Galena	83
Sphalerite	5
Baryte	?
Siderite	10
Pyrite	2

Texture: The two main minerals present are siderite (to 1 mm size in masses) and embedded in siderite. The siderite shows regular fracturing along rhombohedral cleavages where pyrite entered the thin cleavage spaces; later entered by galena. Also siderite shows irregular fracturing occurred during brecciation, the brecciation being more intense around edges (up to 0.15 mm) in the larger fragments and continues through the smaller fragments. Siderite forms a strained irregular coarse mosaic of grains. Scattered fine (0.2 to 0.06 mm) pyrite as euhedral grains remain embedded in the galena, or occur massively as lenticles (0.1 to 0.3 mm wide, mm in length), part replaced by galena and flanked by sphalerite (0.2 to 0.3 mm wide). Sphalerite replaced pyrite leaving relicts of the pyrite in the sphalerite groundmass. Galena forms fine veinlets and occurs as fine inclusions in the sphalerite. In places the sphalerite is seen to enter rhomb cleavages of siderite and part replace the mineral. Siderite contains occasional fine pyrite crystal inclusions or euhedral crystals (up to 0.30 mm). Only pyrite and sphalerite are seen to be present as vein-like forms (or lenticles?). These are discontinuous.

No baryte is observed in section. In stained slabs, calcite fills one vug, rimmed by an even zone of siderite.

Sample No. 113961/MPS 3321

Field Name: Pisolitic limestone.

Petrographic Description: A dolomitised oolithic limestone. Between the ooliths are mosaics of coarse calcite containing trails of fine pyrite. There is no present evidence of a previous calcite mud matrix prior to coarse calcite crystallisation. A lath-like fine calcite fragment is present at centre of one oolith.

Mineralogy:	Vol.%
Dolomite	80
Calcite	19
Sulphides	1

Texture: The pisoliths are evenly distributed as round and subrounded bodies (5 to 12 mm) but are mainly about 8 mm diameter, consist of granular aggregates of dolomite (0.05 to 0.18 mm) welded together and with many rhombohedral forms, some showing curved crystal faces, characteristic of the mineral and showing fine specks of pyrite in narrow, welded networks between the grains. One lenticular mass (2.7 x 0.6 mm) of recrystallised grains occurs a short distance from a narrow vein breccia zone penetrating the same pisolith. Probably the latter is fracture fill with dolomite, or a vein relict after dolomitisation. Thin trails of carbonate veins 'cut' across granules from one side of the oolith to the other. Rare nuclei of recrystallised shell fragments (0.25 x 0.6 mm, 0.9 x 0.5 mm) occur at centre of pisoliths and grain size of constituent granules is constant from the centre to the pisolith margin.

Matrix is of coarse plates of zoned rhombs of ferroan and plain calcite, fairly equigranular (0.4 to 1.2 mm in size) filling spaces between the pisoliths (0.6 to 3.2 mm wide). Trails of pyrite (0.02 to 0.12 mm and aggregates to 0.3 mm) follow the calcite interstices but generally crystallised

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marginal to pisolith and occasionally form veins in pisoliths Presence of pyrite would indicate a subsequent foetid environment followed the high energy sedimentation environment indicated by the ooliths.

Sample No. 113962/MPS 3322

Field Name: Massive sphalerite and galena.

Petrographic/Mineragraphic Description: Early colloform precipitation of pyrite framboids show recrystallisation into euhedral forms; replaced by sphalerite and galena. The latter were contemporaneous with some slightly later sphalerite. Nucleation around pyrite and carbonate probably occurred. Not a vein sample but crustiform filling of a leached cavity in siderite sediment and earlier syngenetic (or syndiagenetic) pyrite framboids.

Mineralogy:	Vol.%
Sphalerite	75
Galena	20
Pyrite	5
Arsenopyrite	<1

Texture: Thin section. The polished thin section shows no carbonate or silicate association, just colloform sphalerite showing fine non-ferriferous and ferrigerous repetitive concentric banding (0.01 to 0.12 mm weak) but irregular in width. The iron oxide rich structures often form centres (0.12 to 0.5 mm) scattered through the sphalerite mass and surrounded by much broader (to 0.8 mm wide) pale yellow sphalerite, practically lacking in iron. In a colloform structure the iron rich sphalerite would have been precipitated last in almost every case. In places a yellowish sphalerite is surrounded by a zone of the iron rich variety followed outwards by further pale yellow (non ferriferous) sphalerite.

The colloform structures also tend to be elongate following stretched ellipsoidal cavities (to 6 mm in length); also occur bands of small concentric structures (as described above) which trend parallel with the elongate cavities to give a banding to the sulphide-fill structure, showing layers of galena (~ 1.6 mm wide) in between Galena also forms

networks within the ellipsoidal sphalerite growths and shows alternate structures of polyhedral grains (0.3 to 0.8 mm dia.) within the mosaics of rounded colloform sphalerite shapes.

Polished Section: Shows sphalerite surrounding galena (0.9 x 0.5 mm) as lenticular growths containing fine pyrite (0.01 to 0.05 mm) as part corroded cubes which contain specks of carbonate and which are therefore modified framboids. The veins of galena and scattered pyrite occur throughout the sphalerite mass. Blebs (0.005 to 0.02 mm) of galena are scattered within the sphalerite, and islands of embayed sphalerite (0.01 to 0.35 mm) occur within galena masses. Tiny framboids of pyrite (0.005 to 0.02 mm) form groups within carbonate flanking voids and contain specks of melnikovite pyrite alternating with fine raspberry forms of pyrite. Galena is seen to have replaced some pyrite framboids but no actual galena (or sphalerite) gel forms are detectable. Arsaenopyrite as wedge shapes (0.01 to 0.15 x 0.10 mm) are present as euhedral crystals scattered through sphalerite or embedded in pyrite. Similarly fine rhomb siderite(?) shapes (0.002 to 0.025 mm) occur as inclusions in sphalerite masses.

Around edges of sphalerite structures are irregular pyrite aggregates (1 x 0.5 mm) showing pyrite framboids with later pyrite growth.

Paragenesis: Framboids of pyrite $\rightarrow$pyrite + arsenopyrite$\rightarrow$ galena $\leftrightarrow$sphalerite.

Sample No. 113963/MPS 3323

Field Name: Massive galena:sphalerite.

Petrographic Description: Banded sphalerite, galena, baryte sediment with sulphide filled cavity structures at opposite end of section. Precipitation of sulphides as mud (similar to Red Sea hydrothermal type) - syndiagenetic deposition was followed by further diagenesis showing a weak colloform structure. Baryte and carbonate crystal forms were strongly silicified.

Mineralogy	Vol.%
Quartz	8
Illite	3
Limonite	2

Texture: Thin section. A banded rock consistsing of layers of prismatic silicified crystals of baryte blades and carbonate rhombs alternating with layers of sphalerite. However, bands are not continuous and 'beds' are not quite conformable, due to some deformation.

In one corner of the section occurs a large (7 x 5 mm) nodule of sphalerite accreted to galena containing abundant inclusions of detrital quartz and thinly veined by galena and quartz. Alongside the large sulphide aggregate are fine bands of unoriented altered baryte laths, fine sulphides and silty quartz. The baryte varies 0.05 to 0.3 x 0.05 mm as laths with subangular similar size quartz and iron oxide-stained fine illite. Coarse 'overlying' beds of altered baryte (mainly laths 0.1 x 0.3 mm) really includes an abundance of a larger 'baryte' size compared with baryte in the underlying beds and the zone contains a large fissure filled with galena (2.4 x 0.6 mm) containing silicified baryte inclusions (to 0.08 mm) and other diagonally dispersed grains of similar size. Also contains a cross-cutting vein of pyrite.

Below the mainly altered baryte bands are scattered sphalerite aggregates (~1 6 x 1 6 mm) with a matrix of baryte

crystals. Discontinuous bands (~ 3 mm wide) of sphalerite with galena continue down the section with an abundance of baryte and some quartz. Towards the bottom, sphalerite bands become broader (4 mm wide) and continue across the section, contain inclusions of quartz (0.4 x 0.3 mm) and baryte along fractures and large 0.6 x 0.4 mm grains of galena within the sphalerite mosaic. Near the bottom a broad band (2 mm wide) of galena contains vugs and 'inclusions' of sphalerite with massive sphalerite and minimal baryte at the bottom.

Using incident light it is seen that traces of carbonate rhombs are embedded in galena and sphalerite masses contain an abundance of moderately well distributed galena inclusions (0.06 to 0.14 mm) and occasional pyrite. Galena also occurs as truncated vein forms and 'blebs' intermixed with the 'baryte' matrix. Sphalerite contains tiny (<0.01, 0.08, 0.12 mm) anhedral and euhedral pyrite and chalcopyrite inclusions. Both sphalerite and galena contain baryte forms.

From the observations made above, sphalerite and baryte crystallised at almost the same time. Earlier galena trapped baryte mainly along vein-like fractures. Pyrite was an earlier form in sphalerite and chalcopyrite exsolved from sphalerite during crystallisation.

There is however a singular lack of detrital quartz and clay. Probably a precipitation of baryte and sulphides as mud which was followed by some diagenetic segregation towards the end of crystallisation. A weak colloform arrangement is noted which resulted from diagenetic rearrangement and growth.

Alteration: Very strong silicification.

Sample No. 113964/MPS 3324

Field Name: Sedimentary breccia.

Petrographic Description: Slump breccia of a lagoonal type sediment. A possible texture overprint. Shaley interbeds (shale and mudstone) have whilst fluid slumped during flow (spontaneous?) on a gentle slope and result in bond casting of the more shaley beds developing (like 'boudins'). Not possible to answer the question re core fill deposit.

	Zones*			
Mineralogy	(a)	(b)	(c)	(d)
Illite	89	70	75	40-0
Limonite	5	-	2	-
Pyrite	3	3	-	-
Quartz	3	27	15	60-80
Baryte	-	-	5	-
Iron oxide breccia	-	-	3	-

* Zones (a) dark shale; (b) cherty shale; (c) scattered sand size quartz; (d) coarse quartz.

Texture: Mineralogically similar but texturally different subaqueous slumped beds of mainly illite. Probably the result of mud flow with lenticular bands sheared out and displaced. Lenticles are <1 to several mms of variable thickness due to mass flow, grain flow and drag between the beds of variably structured lithologies. Absence of convolute bedding indicates plastic sediment with little shear strength and battle.

Beds of (a) thinly laminated quartz, iron oxide (bituminous matter?) (2-5 mm maximum width) show a weak convoluted structure and are almost continuous across the section being sheared out by the pressure of overlying sediment and represented as 'boudin' like structures.

The (c) type is illite containing uniformly scattered clastic quartz (0.02 to 0.1 mm) and is represented as a series of

sheared out bedded clay structures following the flow 'bedding'. A large fragment (2 mm) of silicified quartz breccia (d) has depressed the 'bed' in one place, part of a discontinuous bed that is squeezed into linear bands.

The (d) (3.0 mm wide) type are either quartz breccia or quartz arenite beds of subangular very fine to medium sand size with evenly distributed fine illite matrix. Beds are weakly contorted and shear out at one end of section. Some brecciation of clasts is noted.

The (b) type cherty shale is similar to (a) without as much fine iron oxide,(some bituminous?) laminae.

Other essentially illite beds are wider (8 mm at widest part), were more fluid and have become intermixed (complete miscibility) with (c) in places and contain laminae (to 2.2 x 1 mm) of mudstone clasts picked up during flow; also present are coarse quartz ($\sim$0.8 mm) clastics and lighter illite fragments ($\sim$0.7 mm).

The whole structure taken together,suggests mud flow on a gentle slope showing seasonal(?) variable inflow of mud and mud and quartz clasts. The lenticular, continuous laminated paper shale type deposit is a paludal or swamp sediment Probably sedimented in a lagoon that was intermittently closed from the sea to account for the formation of the dark paper shales. Absence of quartz and baryte shows a weak inflow of water that contained few solubles. There is a tectonic overprint of shear that affected the paper shales with strongly quartzose and baryte bearing 'layers'.

There is insufficient evidence to determine whether this is a cave fill deposit, though it seems unlikely.

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APPENDIX I

411

115413

Amoco Minerals Australia Company
(Inc. in Delaware, U.S.A., with Limited Liability)

Amoco Building
201-209 Pacific Highway, North Sydney
P.O. Box 949, North Sydney 2060
Phone: 923-7509
Cables: Amocaus
Telex: 26945

Zeehan Office
61 Counsel St
Zeehan Tas. 7469
ph (004) 716282

9/11/

Minpet Services
659 Botany Road
Rosebery N.S.W. 2018

Dear Mr Curtis,

Please find enclosed 14 drill core and rock samples from our Zeehan Tasmania project area. The ground is held in joint venture with C.S.R. who have recommended your services. All samples are from the Ordovician Gordon Limestone. Exploration in the area has been modelled on the Irish type carbonate hosted sedimentary exhalative lead-zinc-silver deposits. Could you please make note of any evidence supporting or disputing this style of mineralization. Please don't hesitate to call if you any questions.

Yours Faithfully

Greg Kary

Greg Kary.

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Order

E 13301

Amoco Minerals Australia Company

Vendor Munpet Services
P.O Box 192
Beaconsfield N.S.W 2014

Date 9/5/84

Ship To: Amoco Minerals
61 Counsel St
Zeehan Tas. 7469

Mail Invoices to: ~~P.O. Box 040, North Sydney, N.S.W. 2060.~~ 61 Counsel St Zeehan Tas 7469

Please Supply:

Thin and some Polished section preparation and descriptions

Sample # 113951 - 113964

Order Number must be Quoted on Invoice

Project No.: AS4-109 Authorised:

A/C Dissection: Checked:

Received:

APPENDIX II

414

115416

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113951

FIELD NAME: Dolomitized Limestone
DTB-84-1 83.9-84.0m

BRIEF DESCRIPTION: Finely crystalline Dolomitized wackestone. Abundant dolomite line veins with minor associated galena and sphalerite and trace pyrite. Occasional carbonaceous (graphitic?) laminae

LOCAL GEOLOGY: Upper sequence of the Ordovician Gordon Limestone

SIGNIFICANT GEOCHEMISTRY: No assays available at this time

WORK REQUIRED: Thin section Description.
- Is mineralization related to dolomitization?
- Is dolomitization a primary or secondary texture

415

115417

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113952

FIELD NAME: Argillaceous Dolomite

DTB-84-1A 177.1m

BRIEF DESCRIPTION: Black fine, dolomitic, moderately silty, cut by network of very fine veinlets

LOCAL GEOLOGY: Upper section of the Ordovician Gordon Limestone - 100 m downhole from # 113951

i.e lower in sequence than # 113951

SIGNIFICANT GEOCHEMISTRY: Not sampled at this stage

WORK REQUIRED: Complete thin section description, with emphasis on descriptions relating to genesis of unit.

416

115418

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113953

FIELD NAME: Chaotic Fragmental Fossil Breccia
DTB-84-1A 198.4 m

BRIEF DESCRIPTION: Wide variety of grey fossil and lithic fragments in a black, possibly argillaceous, limestone matrix

LOCAL GEOLOGY: Upper Gordon Limestone - Ordovician
20 m downhole of # 113952
i.e. lower in sequence than #113952

SIGNIFICANT GEOCHEMISTRY: Not assayed at this stage

WORK REQUIRED: Complete thin section description
- Does this represent a high or low energy environment.
- Please note if any sulphide fragments are found.
- Our main interest is in defining areas of ~~not~~ syndepositional faulting as possible zones where faults may act as mineralized fluid conduit. i.e. an Irish style of carbonate hosted Pb/Zn

417

115419

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113954

FIELD NAME: ~~Sph~~ Calcite vein, minor sphalerite

DTB-84-1A 193.7m

BRIEF DESCRIPTION: ~~Sph~~ Sphalerite crystals? and limestone fragments in a white calcite vein cutting through a dark grey limestone.

LOCAL GEOLOGY: Ordovician Gordon limestone ~ 5 m up-hole from # 113953, ie higher in sequence

SIGNIFICANT GEOCHEMISTRY: Not assayed at this stage

WORK REQUIRED: Complete thin section description
- Is it a vein
- What is the nature of contact with grey limestone

418

115420

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113955

FIELD NAME: Breccia - fossil and lithic fragments
DTM - 84 - 5 82.3m

BRIEF DESCRIPTION: Grey fossil and lithic fragments in a dark grey possibly silty limestone matrix

LOCAL GEOLOGY: Gordon Limestone Ordovician Upper part of sequence in Zeehan area.

SIGNIFICANT GEOCHEMISTRY: ———

WORK REQUIRED: Complete thin section Description - as # 113953

115421

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113956

FIELD NAME: Calcite and siderite veining, ~~xxxx~~ in limestone

DTM-84-5 78.4 m

BRIEF DESCRIPTION: Dark grey limestone cut by thin veins of white calcite and cream to brown siderite. Minor galena in veins

brown after exposure to air

LOCAL GEOLOGY: Gordon limestone
~ 5 m up-hole from # 113955
lower in sequence

SIGNIFICANT GEOCHEMISTRY: 0.22% Pb, 0.29% Zn, 7 g/t Ag
2.00% Mn

WORK REQUIRED: Complete Thin Section Description
- as # 113954

420

115422

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113957

FIELD NAME: Galena-Sphalerite mineralization

DTM-84-2 150.0m

BRIEF DESCRIPTION: Coarse galena and sphalerite in a calcite matrix, some "vein" textures but conformable to bedding.

LOCAL GEOLOGY: Gordon - Limestone Ordovician

SIGNIFICANT GEOCHEMISTRY: - over a 1m interval
2.15% Pb, 3.50% Zn, 49 g/t Ag
3.30% Mn

WORK REQUIRED: Polished + Thin section Description
- Relationship of galena and sphalerite?

421

115423

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113958

FIELD NAME: Galena - sphalerite in a carbonate host

DTM-84-2 140.4 m

BRIEF DESCRIPTION: Disseminated galena and sphalerite in a calcite matrix, cut by small siderite vein.
Possible breccia textures.

LOCAL GEOLOGY: Gordon Limestone - Ordovician
~ 10 m up-hole from 113957, ie higher in the sequence.

SIGNIFICANT GEOCHEMISTRY: 1.94% Pb, 1.40% Zn, 18 g/t Ag
0.80% Mn, 3.75% Ba. over a 1 m interval

WORK REQUIRED: Thin section description
- Do textures point to a vein origin?
- Is there any evidence to suggest syn-genetic or syn-diagenetic mineralization?
- What is the reason for 3.75% Ba.?
- Do a polished section if you think it would provide useful information.

422

115424

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113959

FIELD NAME: Calcite - siderite ~~Hematite~~ - with Galena
Sphalerite - Possible Breccia

DTH-84-~~#~~2 139.5 m

BRIEF DESCRIPTION: Galena - siderite, pyritic and limestone fragments in a calcite matrix. Slightly angular fragments

LOCAL GEOLOGY: Gordon Limestone
1 m up-hole of 113958, ie higher on the sequence.

SIGNIFICANT GEOCHEMISTRY: 4.05% Pb, 0.73% Zn, 215 g/t Ag
6.10% Mn 1.10% Ba over a 1m interval.

WORK REQUIRED: Thin and Polished Section Description
- What is source of high Ba ~~ite~~
- Description of Breccia texture; vein or sedementary ?
- The high silver values often occur with high lead values, what is their relationship.

423

115425

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113960

FIELD NAME: Semi-massive galena

DTM-84-2 134.2m

BRIEF DESCRIPTION: Galena with 10-15% siderite, minor calcite

LOCAL GEOLOGY: Gordon limestone
~ 5 m up-hole from 113959 i.e higher in section.

SIGNIFICANT GEOCHEMISTRY: 8.25% Pb, 2.80% Zn, 76 g/t Ag
9.30% Mn, 1050 ppm Ba

WORK REQUIRED: Polished section Description

424

115426

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113961

FIELD NAME: Pisolitic limestone

DTM-84-2 77.0m

BRIEF DESCRIPTION: up to 1 cm wide pisolitis, often formed about a shell nucleus in a calcite (sparite) matrix

LOCAL GEOLOGY: Gordon Limestone
~60 m up-hole from 113960, i.e. higher in sequence.

SIGNIFICANT GEOCHEMISTRY: ———

WORK REQUIRED: Complete thin section Description.

425

115427

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113962

FIELD NAME: Massive sphalerite and galena
Mariposa Costean L 59200N - 67340E

BRIEF DESCRIPTION: Banded sphalerite and galena, slightly vuggy
- costean sample

LOCAL GEOLOGY: Gordon Limestone - Ordovician, near faulted contact with Cambrian Dundas formation

SIGNIFICANT GEOCHEMISTRY: From a 2m costean sample of 975 ppm Cu, 7.79% Pb, 15.8% Zn, 1300 g/t Ag, 56 ppm Sn

WORK REQUIRED: Polished section. Is it likely this is a vein sample which is probably related to the adjacent fault?

426

7 mm

115428

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113963

FIELD NAME: Massive Galena / Sphalerite
Sunny Corner Costean L 65421E - 57800N
(Bannockburn)

BRIEF DESCRIPTION: Possibly bedded, galena and sphalerite mineralization. Sphalerite often occuring as clusters or rosettes

LOCAL GEOLOGY: Gordon Limestone - Ordovician

SIGNIFICANT GEOCHEMISTRY: 1500 ppm Cu, 16.9% Pb, 17.60% Zn, 148 g/t Ag over a 2m costean sample.

WORK REQUIRED: Polished section description - Are sulphides bedded.

427

115429

FOR ROCKS SUBMITTED FOR PETROLOGY

NUMBER: 113964

FIELD NAME: Sedimentary Breccia
Sunny Corner Costean Line 4 60-62m
(Bannockburn)

BRIEF DESCRIPTION: Black and grey lenticular fragments on a dark grey matrix - Minor soft sediment deformation. Minor sphalerite and galena fragments

LOCAL GEOLOGY: Gordon Limestone - Ordovician
Costean sample

SIGNIFICANT GEOCHEMISTRY: 0.89% Pb, 0.51% Zn, 3g/t Ag

WORK REQUIRED: Thin section description
- Style of breccia
- Could the sample represent a recent (post limestone deagenesis) cave fill deposit?

428

115430

MINPET SERVICES
659 Botany Road
ROSEBERY, N.S.W.

REPORT NO. 71/84

PETROGRAPHY OF MISCELLANEOUS ROCK SPECIMENS

(prepared for Mr. G. Kary,
Amoco, Tasmania)

October 1984

429

115431

CONTENTS

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1.	INTRODUCTION	1
2.	SUMMARY	2
3.	PETROGRAPHIC DESCRIPTIONS	3

430

115432

1. INTRODUCTION

Herewith the results of the petrographic study on four specimens Mr. Kary left with Minpet Services on his last visit to Sydney in September 1984.

2. SUMMARY

0.1% Pb, 0.3% Zn, 26g/t Ag, 2.1% Mn

.. Costean A - High silver (30 ppm). Mariposa L 5945ON - 6729OE
A siderite sediment that contains deformed clastic quartz, and evidence of ooliths present. Shear zones are indicated by brecciated carbonated and a sheared sericite layer. Silver was likely adsorbed onto limonite (after brine solution) (Geldsetzer, 1973).

.. Costean B. - as Costean A. - with minor tube-like fossils
Algal carbonate (largely siderite), shows slump of associated carbonate. Fronds are now chalcedony filled. Silver - ex algae after brine is now adsorbed on to limonite (as $AgCl^-$ $AgSO_4^{--}$, Geldsedzer, 1973, also Rankama, 1950).

.. D.T.S.C.-84-5A (52.7 m).
Algal carbonate (largely fine siderite) contains relicts of bituminous fronds, silty quartz and dolarenite in areas between fronds.

.. D.T.S.C.-84-5A (56.5 m).
A carbonatised (sideritised) acid volcanic. Shows silicified feldspar phenocrysts. Contains an equigranular fine sand size ferruginous carbonate matrix.

Siderite association with Pb, Ag and Zn ore zones (ref, Coeur d'Alene, Keno Hill, etc.), see Deer Howie & Zussman "Rock Forming Minerals" vol.5 Non-silicates. Siderite replacement of groundmass in D.T.S.C.-84-5A (56.5 m) specimen is probably diagenetic as there are no signs of hydrothermal veins present.

It is interesting to note that siderite in the Zeehan area of Tasmania may contain up to 230 ppm Ag which is undetectable microscopically (oral communication, A/Prof. K.L. Williams, Sydney University). Origin of silver is thought to be from an antimony rich tetrahedrite at Zeehan.

115434

3. PETROGRAPHIC DESCRIPTIONS

.. Sample: Costean A/MPS 3399. High silver.

Petrographic Summary: Siderite sediment with scattered clastic quartz grains including porphyrotopes. Strong sideritisation. Evidence of ooliths. Shows shear zones flanking 'veins'. Shelf sediment.

Mineralogy	Vol.%
Siderite*	89
Calcite	5
Quartz	3
Sericite	2
Chert	1
Iron oxides	2

Vein: Calcite ± limonite trails (no recognisable sulphide relicts).

* Checked by staining technique.

Texture: Mainly, the rock is a sideritised calcite sediment of even carbonate grains, 0.012 to 09.08 mm and median size 0.04 mm or siderite siltstone size. Oolites and rhombs are scattered throughout the section and the latter show overprinting of earlier carbonate grains in addition brecciation and recrystallisation. The texture is of recrystallised brecciated rhombs.

Other clasts present in the section are heterogeneously dispersed quartz of anhedral forms (0.08 to 0.8 x 0.4 mm) and subrounded chert clasts (to 1 x 0.6 mm) showing a fine saccharoidal mosaic texture of fine chert (after carbonate?); also quartz breccia aggregates (to 0.8 x 0.4 mm), intermixed with clear carbonate. Most quartz shows some strain with some grains showing severe strain and shear.

Plain light reveals shear and brecciation of calcite veins (now clear) which also flanks veins as brecciated carbonate. Thin trails of very fine quartz associated in one case with thin sheared sericite bands indicates some early bedding.

Alteration: Some chertification of carbonate and sideritisation.

Metamorphism: Tectonic brecciation, mainly obscured by recrystallisation of carbonate. Slab-like siderite breccia fragments occur.

.. Sample: Costean B/MPS 3400. High silver.

Petrographic Summary: A slumped silty carbonate sediment; a sideritised calcite host for algal structures. Shows leaching of residual calcite and subsequent chalcedony/ quartz filled algal(?) structures.

Mineralogy:	Vol.%
Siderite*	56
Calcite	30
Chalcedony	10
Quartz	2
Iron oxides	2

* Stain method.

Texture: An even grained slumped fine siderite siltstone (0.03 to 0.08 mm, median 0.05 mm). Made up of siderite rhombs, often zoned, with occasional grains retaining a nucleus of calcite. In places siderite grains are surrounded by overgrowths of the mineral and together the siderite has recrystallised into polyhedral mosaics. Areas of balled up clear but dark siderite (e.g. one fragment 20 x 13 mm) are part of a dense bed, and are flanked by narrower beds of slumped calc-siltstone (2 x 0.4 mm) and separated by lighter beds often with tiny vugs (0.2, 0.3 mm) filled with chalcedony.

Cross-cutting but often following the beds are lobate (1 to 8 x 2 mm) elongate stromatolite structures filled with spherulitic chalcedony which rarely contain a quartz nucleus surrounded by spherulitic fibres of the chalcedony. There is commonly strong limonite staining flanking the chalcedony structures associated with strongly porous calcite areas; also limonite is deposited around periphery of structures. Recent algal forms that are now present in calcite were subsequently mainly sideritised, since they cut across slump bedding. This was followed by leaching of

organic material, with cavities filled by chalcedony? It is interesting to note that these stromatolite forms do not breach the central mass (20 x 13 mm) of clear calcite.

Alteration:

i) Strong sideritisation of calcite.

ii) Leaching of algal(?) forms and filling with chalcedony and secondary quartz.

iii) Weathering has caused siderite to deposit limonite leaving cloudy brown biotite.

.. Sample: DTSC-84-5A (56.5 m)/MPS 3401

Petrographic Summary: Sideritised porphyritic volcanic rock. Shows extensive leaching of groundmass and some leaching of phenocrysts.

Mineralogy	Vol.%
Siderite*	88
Chert (phenocrysts - 'feldspar' 3 vol.%)	5
Voids	7

* Confirmed by staining technique

Texture: Limonite stained siderite occurs as zoned rhombs and polyhedral mosaics. Grain sizes of quite even grains vary, (0.013 to 0.039 mm, median size 0.04 mm). Often grains have brownish limonitic centres. Voids are abundant, scattered throughout the section, also narrow truncated vein-like areas contain traces of chert but in several cases show cherty leached feldspar phenocrysts (~ 0.8 x 0.5 mm). Siderite grains have filled fracture networks in these feldspars or have made deep embayments into the 'phenocrysts'. Other feldspar phenocrysts (0.2 x 0.08 mm, 0.8 x 0.3 mm) are completely silicified with only narrow fractures containing siderite. Often the phenocrysts are aggregated but their general disposition shows a lack of orientation.

Alteration: A glassy(?) groundmass of volcanic rock was carbonatised (to siderite). Feldspar phenocrysts were leached and silicified with some showing carbonate embayment or carbonate in fractures.

Note: There is no evidence of original texture of volcanic rock groundmass though the even siderite texture suggests uniformity.

.. Sample: DTSC-84-5A (52.7 m)/MPS 3402

Petrographic Summary: Algal limestone showing some bituminous fronds. Silt-size quartz is present. A lagoon or intertidal shelf environment of carbonate deposition.

Mineralogy	Vol.%
Siderite (fine, stains for siderite)	20
Dolomite (coarse clear crystals)	62-53
Chalcedony	2
Bitumen	7
Quartz (clastic)	3-12
Quartz (replacement)	3
Limonite	3

Calcite veins.

Texture: Distinct algal forms as subparallel fronds are situated in a coarser dolomite matrix.

The algae are present as fine (~ 0.013 mm grains) of siderite aggregates that have replaced the otherwise bituminous fronds. The latter are fragmentary (0.04 to 0.12 mm), scattered through a limonite stained coarser dolomite (dolosiltstone), varying 0.02 to mainly 0.06 mm as clear rhombs of the mineral with irregular networks of fine (0.01 mm) siderite of algal replacement. The latter may also be present as alternate lenticular layers (~0.5 mm wide) to the coarser rhombs of a clear dolomite, forming mosaics of equigranular grains of dolosiltstone. Interspersed with the non-algal dolomite are subangular grains (0.01 to 0.08 mm) of clastic quartz. Dolomite growths have part replaced some of the quartz clasts. Thin networks of calcite veins cut across the dolarenite. Quartz or chalcedony replace some fronds (similar to those in Costean B).

Alteration: Algal material → bitumen → siderite → quartz/chalcedony. Calcite → dolomite (+ siderite) which crystallised to perfect rhombs in the interspaces between fronds.

4. REFERENCES

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"Syngenetic Dolomitisation and Sulphide Mineralisation" from 'Ores in Sediments', Ed. by G.C. Amstutz and A.J. Bernard (1973). Pub. Springer Verlag.

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"Geochemistry". Pub. The University of Chicago (1953).

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115442

APPENDIX 11

ENVIRONMENTAL REPAIR OF COSTEAN AND DRILL PADS OCEANA, BLACK JACKS, SUNNY CORNER, BANNOCKBURN AND MARIPOSA PROSPECTS BY AMOCO

by Environmental Management Services

440

115443

Environmental Management Services Pty. Ltd.

215 CHANNEL HIGHWAY
TAROONA 7006

PH (002) 279250

21st June 1985.

The Manager,
AMOCO Mineral Exploration,
ZEEHAN. TAS.

Dear Sir,

Herewith an interim report by Dr. F.D. Podger on restoration of costeans at your Oceania, Blackjacks, Sunny Corner, Bannockburn and Maraposa prospects.

Our final report will now be submitted before the end of August. This revised date, due to contractors completing the refilling later than originally envisaged, is acceptable to your Mr Jones.

Yours faithfully,

P. & A. WATERMAN.

441

115444

Environmental Repair of Costeans and Drill pads Oceania, Blackjacks, Sunny Corner, Bannockburn and Maraposa Prospects of AMOCO

Consultants Interim Report - June 1985.

Dr. F.D. Podger B.Sc.(For) M.Sc.(For) Ph.D.

Definition of objectives.

Regulations of the Tasmanian Department of Mines provide no detail of specific requirements or standards for environmental repair. Conditions of the licences require simply that the affected areas are returned to a condition which will permit natural recovery of vegetation.

Discussions were therefore held with officers of the Department of Mines particularly Mr David Jennings in order to establish some feeling for a standard of work which was likely to meet their approval. The key elements perceived were a return of the sites to a contour not inconsistent with the surrounding landscape, a surface suitable for the regeneration of vegetation native to the area and the removal of introduced rubbish.

Discussions were also held on site with Mr Phil Jones of AMOCO who showed me all five prospect areas. Constraints of terrain, particularly boggy areas, limitations of available machinery and the fact that the costeans had been dug so that return of spoil in the desirable reverse order of removal was not always possible were influences mitigating against repair of a uniformly high quality. A minimum standard for acceptable costean repair was agreed informally as

(i) good contour

(ii) no dangerous vertical faces

(iii) Not less than 30% of costean surface area must be peat or mineral soil suitable for plant establishment

(iv) the area of suitable surface be distributed over the total area so that no large areas unsuitable for revegetation remain

(v) Planting or seeding of areas would be undertaken where no suitable source of native species occurred immediately adjacent.

Our preliminary inspections indicated that drill-pads presented greater difficulty and should be the subject of experimentation during 1985/6 on a small scale rather than immediate overall treatment with unproved procedures.

Field Work

Each costean has been inspected on foot; detailed notes were made on contour, surface conditions, location of rubbish, availability of seed and the presence or absence of the root-rotting fungus *Phytophthora cinnamomi*.

Several costeans which did not meet the standards outlined above have been reworked to bring them up to standard. Several others which might be improved are in boggy terrain where further environmental damage might attend efforts to repair; these are recommended for no further treatment.

Part of one costean Bannockburn 57200N which has been overlooked by the contractor is particularly deep, steep sided and therefore dangerous. It should be filled in summer 1985/6 when machinery can move into the area without creating further damage *en route*.

Some introduced rubbish, of a non biodegradable kind, remains to be removed. Its location will be indicated in our final report.

A small scale programme of experimentation for drill pad rehabilitation is planned for summer 1985/86.

Inspection by Department of Mines

Mr David Jennings, accompanied by Mr Jones and myself, has inspected works at Oceania and Blackjacks. As a result agreement has been reached

(i) on work required to minimise further damage from a broken water race which has presented problems for the repair of one costean

(ii) on the derirability of the experimental approach to drill pad revegetation

(iii) the generally satisfactory standard of repair of costeans.

Conclusion.

No planting or seeding of costeans will be required provided the areas of the works are protected from burning for, say, the next five years. This requirement has been discussed with the local senior officers of the Tasmanian Forestry Commission and Country Fires Board who have expressed willingness to cooperate.

Drill pads will require seeding or planting; decision as to methods will depend upon the results of proposed experimentation.

The quality of repair work on costeans has improved immensely during the consultancy due to the enthusiasm and vigor which Mr Jones has brought to this project and to the considerable skill of the contractors. The standard of later work can only be described as excellent.

Finally I am pleased to be able to endorse the view expressed to me by Mr Jennings that the exercise has been conducted in a sensible, highly professional and environmentally responsible manner.

Rodgers.
21/6/85.

004

EL 15/76
Amoco/CSR Joint Venture

Limit of Amoco/CSR Joint Venture Area

MURCHISON HIGHWAY

ZEEHAN HIGHWAY

Tx EM Loop 1

DTBJ-84-2

DTBJ-84-1

Black Jacks Prospect

Misery Hill

Australasian Workings

Quarry

Dump

Adit

Cut

Track

Fence

Watercourse

Firebreak

Sunny Corner drill access track

Drainage channel

Ties to Mariposa

Recreation Reserve

DUNDAS RIVULET

Sunny Corner

Tramway

Sc Scl Sa Sk Sac Df Og Om €Ed €m €ml €m2 €cl €f €d

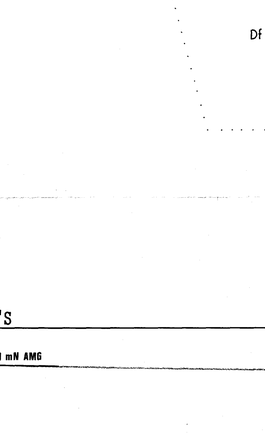
5362000 N
39°53'S
5361000 N
39°54'S
5360000 mN AMG
145°23'E
366000 E
145°24'E
367000 E

62800 N 62600 N 62400 N 62300 N 62200 N 62100 N 62000 N 61900 N 61800 N 61700 N 61600 N 61500 N 61400 N 61300 N 61200 N 61150 N 61100 N 61050 N 61000 N 60950 N 60900 N 60800 N A 60800 N 60700 N 60600 N 60400 N 60200 N 60000 N 59800 N

67600 E 67500 E 67400 E 67300 E 67200 E 67100 E 67000 E 66900 E 66800 E 67700 E

92464 92465 66638 66637 66635 66636 78035 73723 73724

Location



5 cm

TN 11° MN

1:2500
0 100 200 meters

Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist

PALEOZOIC

DEVONIAN Eldon Group
- Florence Quartzite — Df 26

SILURIAN Eldon Group
- Austral Creek Siltstone — Sac 9
- Keel Quartzite — Sk 51
- Amber Slate — Sa 68
- Crotty Quartzite — Sc 6
- ····Siltstone member — Scl 6

ORDOVICIAN Junee Group
- Gordon Limestone — Og 33
- Moina Sandstone — Om 64

CAMBRIAN Dundas Group
- Misery Conglomerate — €m 65
- ····Predominantly shales, minor conglomerate and grits — €ml 65
- ····Predominantly grits, sandstones and minor conglomerate and shales — €m2 65
- Climie Formation ··· predominantly shale — €cl 63
- Fernflow Formation ··· predominantly conglomerate — €f 62
- Dundas Group unassigned — €d 57

Mineralization — 5 14

- Approximate geologic contact
- Inferred geologic contact
- Unconformity
- Fault, approximate position
- Fault, inferred position
- Strike and dip of beds
- Vertical beds, overturned beds
- Strike and dip of joints, of schistosity
- Vertical schistosity
- Dip of unconformity
- Strike and dip of cleavage, vertical cleavage
- Quartz vein
- Costean,(trench), adit
- Old workings - shaft, dump
- Galena, sphalerite, pyrite (from auger holes) (Gn) (Sl) (Py)
- Amoco rockchip/dump sample location *92465

Rockchip results tabled in Report 376

115448

AMOCO

85-2457

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV	004				Black Jacks
ROCKCHIP LOCATIONS AND **GEOLOGY** - DRILLHOLE LOCATIONS					
Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E
Surveyed	P.J., G.K.	Date	1984	Scale	1:2500
Drawn	R.S-K., S.F.	Date	1984	Drawing Nº	M83-2129

Report 450

Enclosure 1

002

EL 15/76

Amoco/CSR Joint Venture

5356000N

5359000N

5358000 mN AMG

39°55'S

145° 24' E

367000 E

368000 E

57800 N

59800 N

59700 N

59600 N

59500 N

59400 N

59300 N

59200 N

59100 N

59000 N

58900 N

58800 N

58700 N

58600 N

58400 N

58200 N

58000 N

67800 E

67700 E

67600 E

67500 E

67400 E

67300 E

67200 E

67100 E

67000 E

66900 E

66800 E

to Zeehan

to Queenstown

Ties to Blackjacks

Ties to Bannockburn

Recreation Reserve

Watercourse

Track

Road

Logging Track

Logging Tracks

Tramway abandoned

Old Mariposa Tram abandoned

drill access track

Access track

Limit of Amoco/CSR Joint Venture Area

RIVULET

DUNDAS

MARIPOSA

KRUMMELS

CREEK

ZEEHAN

HIGHWAY

Swamp

Siliclfication

Breccia

Dump

NBH drillholes

Adit

Cut

Trench

Trenches

Rubbish tip

Sink hole

Ironstone

quartz blow float

Mariposa Main Shaft

pre-collar DTM-84-2

Nevada

Culture positions unreliable in this area

Rockchip sample location *25

Rockchip sample location and number *12
(assay results tabled in Report 376)

DTM-84-8

DTM-84-7

DTM-84-6

DTM-84-5

DTM-84-4

DTM-84-3

DTM-84-1

DTM-84-9

MMDDH 1

MMDDH 2

MMDDH 3

MMDDH 4

MMP

Tx EM Loop3

Tx EM Loop6N

Tx EM Loop5W

Tx EM Loop4S

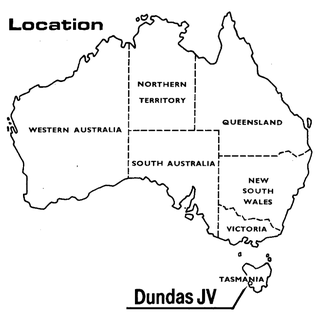
Tx EM Loop2

MM Baseline

75-80°

342°T

Location



TN 11° MN

5 cm

1:2500

0 100 200 meters

Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist

Legend

QUATERNARY
- Recent alluvium

PALEOZOIC

DEVONIAN
ELDON GROUP
- Bell Shale — Db 35
- Florence Quartzite — Df 26

SILURIAN
ELDON GROUP
- Austral Creek Siltstone — Sac 9
- Keel Quartzite — Sk 51
- Amber Slate — Sa 68
- Crotty Quartzite — Sc 6
- Crotty Quartzite siltstone mbr. — Scs 61

Mineralization (see symbols) — 5 147 5'

ORDOVICIAN
JUNEE GROUP
- Gordon Limestone, interbedded limestone dolomite and breccias, mineralization occurs at top and base of sequence — Og 33 14 14
- Gordon Limestone minor siltstone member — Ogs 33
- Moina Sandstone — Om 64
- Mt Zeehan Conglomerate — Oz 58

CAMBRIAN
DUNDAS GROUP
- Dundas Group Unassigned — 6d 57 14
- Dundas Group Unassigned intebedded yellow-orange shales, siltstones and conglomerates — 6ds 60

- Approximate contact
- Inferred contact
- Strike and dip of beds — 71 030
- Vertical beds
- Horizontal beds
- Overturned beds — 85
- Strike and dip of joints — 42 180 / 22 090
- Strike and dip of schistosity
- Vertical schistosity
- Strike and dip of cleavage — 80
- Vertical cleavage
- Approximate fault
- Inferred fault
- Vein q-quartz, fe-feruginous, chl-chlorite
- Mineralization - ironstone outcrop — 5
- Mineralization - after NBH-SBH JV — 5' from level
- Macintyre Mines drillhole — MMDDH 1
- Macintyre Mines peg — MMP

115449

85-2457

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV					Mariposa

ROCKCHIP LOCATIONS AND GEOLOGY – DRILLHOLE LOCATIONS

Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E
Surveyed	P. J.	Date	1984	Scale	1:2500
Drawn	R. S-K., S. F.	Date	1984	Drawing Nº	M83-2128

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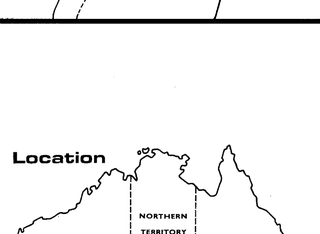
002 Enclosure 2

003

within EL 15/76
Amoco/CSR Joint Venture

Tx EM Loop 7
Tx EM Loop 8
Tx EM Loop 9
SUNNY CORNER GRID
drill access track
DTSC-84-5/5A
DTSC-84-4
DTSC-84-2
DTSC-84-1
DTSC-84-3
DTB-84-1
Adit
Shaft
Trench
Fossil breccia in dump
Dolomite breccia in dump
Silicification in dump
Gravel pit
Old dam wall
Dump — abundant dolomite in dumps
Bannockburn workings
Swamp
Watercourse
Old track
Water race
Tramway
abandoned
Sink hole
Track
Mariposa Creek
RIVULET
DUNDAS
Ties to Mariposa 58600 N
39°55'S
145°23'E
5358000 N
5357000 mN AMG
366000 E
367000 E
58400 N
58200 N
58000 N
57800 N
57700 N
57600 N
57500 N
57400 N
57300 N
57200 N
57100 N
57000 N
56900 N
56800 N
56600 N
65300 E
65400 E
65500 E
65600 E
65700 E
65800 E
65900 E
66000 E
66100 E
66200 E
66300 E
66400 E
66500 E
66600 E
66700 E

Location



TN 11° MN
5 cm
1:2500
0 100 200 meters

Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist

Legend

Devonian
ELDON GROUP
Bell Shale — Db 35

Silurian
ELDON GROUP
Austral Creek Siltstone — Sac 9
Keel Quartzite — Sk 51
Amber Slate — Sa 68
Crotty Quartzite — undifferentiated — Sc 6
— sandstone, cross bedded — Scs 6
— grits — Scg 6

Ordovician
JUNEE GROUP
Gordon Limestone — Og 33
Moina Formation — undifferentiated — Om 64
— sandstone, tubicolar — Oms 64
— grit — Omg 64
Mineralization — 5 14

Cambrian
DUNDAS GROUP
Dundas Group — undifferentiated siltstones and shales — €d 57
— hematitic conglomerate, minor coarse sandstone — €dc 56

Geological boundary — boundary approximate
Fault — position approximate
Anticline
Unconformity
Quartz vein
Strike and dip of beds
Vertical beds, overturned beds
Joint plane, foliation
Adit, trench (costean)
Shaft, dump from old workings
Amoco rockchip / dump sample location and number * 79649
Rockchip results tabled in Report 376

115450

85-2457

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV				Bannockburn	
ROCKCHIP LOCATIONS AND **GEOLOGY** - DRILLHOLE LOCATIONS					
Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E
Surveyed	P.J., G.K.	Date	1984	Scale	1:2500
Drawn	Geod, R.S-K., S.F.	Date	1984	Drawing Nº	M83-2127

Report 450

003

Enclosure 3

EL 4/78
Amoco

EL 15/76
CSR

EL 15/76
Amoco/CSR JV Area

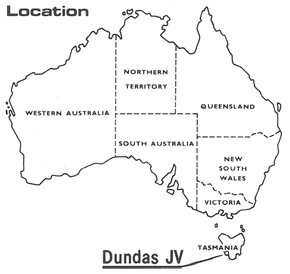
Zeehan
Black Jacks
Bannockburn
Mariposa
Leatherwood
King Billy
Professor Range
Amber Creek

Renison Bell
Black Hill
Carbine Hill
Mt. Razorback
Rayna
Dundas
Kosminski Hill
Moores Pimple
Mt. DUNDAS
Crimson Ck Fm
Oceana
Old smelter
Old Line Road

HIGHWAY
Melba Creek
Nevada Creek
Hurrell Creek
Emu Bay Railway
Dundas Creek
Concert Creek Road
Comet Creek
South Comet Creek
Climie Rivulet
Mariposa Creek
Berry Creek
Rowards Road
Farrell Rivulet
Amber Creek
Ewart Creek
Henty River
Byrnes Creek
Austral Creek
Professor Range Road

145°20' E
145°25' E
145°30' E
5365000 N
5360000 N
41°55' S
5355000 N
42°00' S
365000 E
370000 E AMG
5350000 N AMG

Location



Dundas JV

Legend

Devonian
- Bell Shale — Db — 35
- Florence Quartzite — Df — 26

Silurian
- Austral Creek Siltstone — Sac — 9
- Keel Quartzite — Sk — 51
- Amber Slate — Sa — 68
- Crotty Quartzite — Sc — 6

Ordovician
- Gordon Limestone — Og — 33
- Moina Sandstone — Om — 64
- Mt Zeehan Conglomerate — Oz — 58

Cambrian
- Undifferentiated Cambrian Units — € —

Geologic Boundary
Fault
Unconformity
Anticline
Syncline

TN 11° MN

5 cm

1:25000

0 1 2 kilometers

Base compiled from 1:15840 scale Pieman Project mapping series

Topographic contours in feet

N.B. Geology shown here has been modified by later mapping.

85-2457

115447

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A·80·82
Project Partner					CSR
Dundas JV				Part	EL 15/76
PROSPECT LOCATIONS					
Map Ref. ANG	K-55-5	Latitude	42°00'S	Longitude	145°30'E
Surveyed	Amoco	Date	1983	Scale	1:25000
Drawn		Date	July 1985	Drawing Nº	

Ref: AM/MG85/09

450·45·1

001 Figure 1

005

EL 15/76
Amoco/CSR Joint Venture

Limit of Amoco/CSR Joint Venture Area

MURCHISON HIGHWAY

ZEEHAN HIGHWAY

Misery Hill

Black Jacks Prospect

Quarry

Dump

Adit

Cut

Tramway

Track

Fence

Firebreak

Forestry track

Drainage

Drainage channel

Watercourse

Tks to Zeehan

Tks to Waratah

Tks to Mariposa

Recreation Reserve

Ls Blackstone

DUNDAS RIVULET

5362000 N

39°53'S

5361000 N

39°54'S

5360000 mN AMG

145° 23'E

366000 E

145° 24'E

367000 E

67800 E
67700 E
67600 E
67500 E
67400 E
67300 E
67200 E
67100 E
67000 E
66900 E
66800 E
68900 E
68800 E

62800 N
62600 N
62400 N
62300 N
62200 N
62100 N
62000 N
61900 N
61800 N
61700 N
61600 N
61500 N
61400 N
61300 N
61200 N
61150 N
61100 N
61050 N
61000 N
60950 N
60900 N
60800 N A
60800 N
60700 N
60600 N
60400 N
60200 N
60000 N
59800 N

Location

5 cm

TN 11° MN

1:2500

0 100 200 meters

Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist

A.M.G. NTH

Tc: NWC

Grid Lines

NOTES

Survey by : Amoco
Date : July, 1984
Receiver : Phoenix VLF-2
Tx : NWC
Vertical Scale : 1cm = 10°

Plotting Convention

Dip Angle +E -W

Ref: AM/MG85/09

116411

85-2457

AMOCO

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV				Black Jacks	
VLF DIP ANGLES (NWC)				005	
Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E
Surveyed	P.J., J.S.	Date	1982	Scale	1:2500
Drawn	Mitre Geophysics	Date	July, 1985	Drawing Nº	450.45.3a

Figure 3a

006

EL 15/76
Amoco/CSR Joint Venture

MURCHISON HIGHWAY

ZEEHAN HIGHWAY

Limit of Amoco/CSR Joint Venture Area

Misery Hill

Black Jacks Prospect

DUNDAS RIVULET

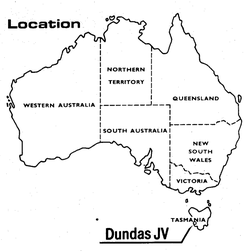
Tramway
Quarry
Dump
Adit
Cut
Track
Fence
Watercourse
Firebreak
Ties to Mariposa
Recreation Reserve
drainage channel
forestry track
1651
1401

67000 E 67100 E 67200 E 67300 E 67400 E 67500 E 67600 E 67700 E 67800 E 66800 E 66900 E 66800 E 367000 E

62800 N 62600 N 62400 N 62300 N 62200 N 62100 N 62000 N 61900 N 61800 N 61700 N 61600 N 61500 N 61400 N 61300 N 61200 N 61150 N 61100 N 61050 N 61000 N 60950 N 60900 N 60800 N A 60800 N 60700 N 60600 N 60400 N 60200 N 60000 N

5362000 N
39°53'S
5361000 N
39°54'S
5360000 mN AMG
145°23'E
366000 E
145°24'E

Location

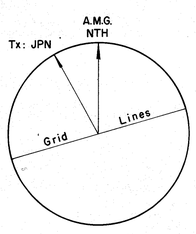


TN 11° MN

1:2500
0 100 200 meters

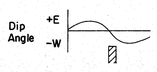
Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist

NOTES



Survey by : Amoco
Date : July, 1984
Receiver : Phoenix VLF-2
Tx : JPN
Vertical Scale : 1cm = 10°

Plotting Convention



115452
85 2457

AMOCO
Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV				Black Jacks	
VLF DIP ANGLES (JPN) 006					
Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E
Surveyed	P.J, J.S.	Date	1982	Scale	1:2500
Drawn Mitre Geophysics		Date	June 1985	Drawing Nº	

450-45-36

Ref: AM/MG85/09

Figure 3b

007

EL 15/76
Amoco/CSR Joint Venture

Limit of Amoco/CSR Joint Venture Area

MURCHISON HIGHWAY

ZEEHAN HIGHWAY

DUNDAS RIVULET

Misery Hill

Black Jacks Prospect

Quarry

Dump

Adit

Cut

Tramway

Track

Fence

Firebreak

Watercourse

Forestry track

drainage channel

Recreation Reserve

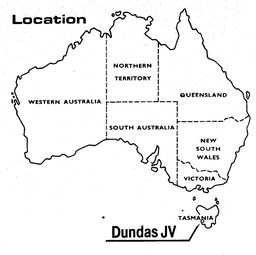
To Zeehan

To Waratah

Ties to Mariposa

5362000 N
39°53'S
5361000 N
39°54'S
5360000 mN AMG
145°23'E
366000 E
145°24'E
367000 E

Location



5 cm

TN 11° MN

1:2500

0 100 200 meters

Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist

A.M.G. NTH

Tx: NWC

Grid Lines

NOTES

Survey by : Amoco
Date : July, 1984
Receiver : Phoenix VLF-2
Tx : NWC

Plotting Convention

Dip Angle +E -W

Filter Algorithm

$(Filt)_n = 2/3\,\theta_{n-2} + 4/3\,\theta_{n-1} - 4/3\,\theta_{n+1} - 2/3\,\theta_{n+2}$

Contours : 2, 5, 10, 15, 20

115453

85-2457

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº A·80·82	
Project Partner				CSR	
Dundas JV				Black Jacks	
VLF FILTERED CONTOURS (NWC) 007					
Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E
Surveyed	P.J, J.S.	Date	1982	Scale	1:2500
Drawn	Mitre Geophysics	Date	June 1985	Drawing Nº	

Ref: AM/MG85/09

450-A5-4

Figure 4a

008

EL 15/76
Amoco/CSR Joint Venture

Limit of Amoco/CSR Joint Venture Area

MURCHISON HIGHWAY

to Zeehan

to Renison

Tramway

Quarry

Dump

Adit

Cut

Track

Fence

Watercourse

Misery Hill

Quarry

Firebreak

Firebreak

Quarry

Black Jacks Prospect

Forestry track

drainage

drainage channel

Quarry

Ties to Mariposa

Recreation Reserve

to Rosebery

RIVULET

DUNDAS

67600 E
67500 E
67400 E
67300 E
67200 E
67100 E
67000 E
66900 E
66800 E
66800 E
67000 E
67100 E
67200 E
67300 E
67400 E
67500 E
67600 E
67700 E
67800 E
67900 E
68000 E
68100 E
68200 E
68300 E
68400 E
68500 E
68600 E
68700 E
68800 E
68900 E

009

EL 15/76

Amoco/CSR Joint Venture

5356000N

5359000N

5358000 mN AMG

39°55'S

145°24'E

367000E

368000E

to Zeehan

67600E

67500E

67400E

67300E

67200E

67100E

67000E

66900E

66800E

59800N

59700N

59600N

59500N

59400N

59300N

59200N

59100N

59000N

58900N

58800N

58600N

58400N

58200N

58000N

57800N

Watercourse

Track

Ties to Blackjacks

Recreation Reserve

RIVULET

Cut

Adit

Swamp

Trenches

MMP

Loggers Track

Road

4 NBH drillholes

Dump

5

6

8

7

9

10

Track

Mariposa Main Shaft

MMDDH 4

Trench

Krummels Creek

Tramway abandoned

ZEEHAN HIGHWAY

DUNDAS

Ties to Bannockburn

MMDDH 3

Nevada

Rubbish tip

Old Mariposa Tram abandoned

Track

to Queenstown

Culture positions unreliable in this area

Tramway abandoned

access to Bannockburn

Sink hole

MMDDH 2

MM Baseline

342°T

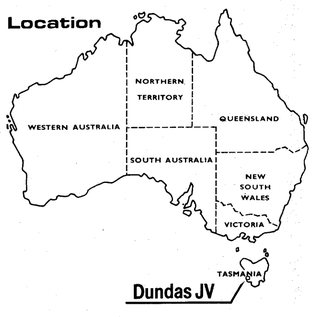
Ironstone

MMDDH 1

Limit of Amoco/CSR Joint Venture Area

MARIPOSA

Location



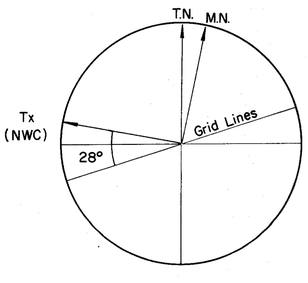
TN 11° MN

5 cm

1:2500

0 100 200 meters

Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist



NOTES

Survey by : Amoco
Date : July, 1984
Receiver : Phoenix VLF-2
Tx : NWC
Vertical Scale : 1cm = 10°

Plotting Convention

Dip Angle +E -W

Ref: AM/MG85/09

115455

85-2457

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV					Mariposa
VLF DIP ANGLES (NWC)					009
Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E
Surveyed		Date	198	Scale	1:2500
Drawn	Mitre Geophysics	Date	June 1985	Drawing Nº	

Report

450-A5-11

Figure 11

010

EL 15/76

Amoco/CSR Joint Venture

5356000N

5359000N

5358000mN AMG

39°55'S

145°24'E

367000E

368000E

to Zeehan

Ties to Blackjacks

Recreation Reserve

Watercourse

Track

Swamp

Cut

Adit

Trenches

MMP

Dump

4 NBH drillholes

Road

Mariposa Main Shaft

MMDDH 4

Trench

Krummels Creek

Logging Tracks

Tramway abandoned

ZEEHAN HIGHWAY

Logging Track

Limit of Amoco/CSR Joint Venture Area

Rubbish tip

Old Mariposa Tram abandoned

Ties to Bonnockburn

MMDDH 3

Nevada

Culture positions unreliable in this area

to Queenstown

Tramway abandoned

access to Bonnockburn

Sink hole

Ironstone

MMDDH 2

MM Baseline

342°T

MMDDH 1

57800 N

58000 N

58200 N

58400 N

58600 N

58800 N

59000 N

59100 N

59200 N

59300 N

59400 N

59500 N

59600 N

59700 N

59800 N

67600 E

67500 E

67400 E

67300 E

67200 E

67100 E

67000 E

66900 E

66800 E

67700 E

67800 E

67900 E

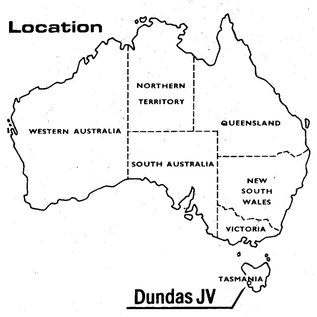
68000 E

DUNDAS

MARIPOSA

RIVULET

Location



1:2500

0 100 200 meters

5 cm

TN 11° MN

Tx (NWC)

T.N. M.N. Grid Lines 28°

Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist

NOTES

Survey by : Amoco
Date : July, 1984
Receiver : Phoenix VLF-2
Tx : NWC

Contours : 2°, 5°, 10°, 20°, 30°

Plotting Convention

Dip Angle +E -W

Filter Algorithm

$$\theta_n = \tfrac{2}{3}\theta_{n-2} + \tfrac{4}{3}\theta_{n-1} - \tfrac{4}{3}\theta_{n+1} - \tfrac{2}{3}\theta_{n+2}$$

Ref: AM/MG85/09 Report

115456

85-2457

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV				Mariposa	
VLF FILTERED CONTOURS (JPN) 010					
Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E
Surveyed		Date	198	Scale	1:2500
Drawn	Mitre Geophysics	Date	June, 1985	Drawing Nº	

450.A.5.12

Figure 12

145°23'E

39°55'S

58 000 N

57 900 N

57 800 N

65 300 E

65 400 E

65 500 E

65 600 E

-40 -34 -13 13 12 63 98 112 133 147 139 107

-69 -56 -38 -18 13 38 118 144 183 201 160 138

-63 -55 -45 -36 -30 6 59 111 140 148 157 140

-17 2 (10) 31 37 77 108 110 122 116 123

56 67 60 94 (94) 63 85 89 77 (77) 58 52 50 32 (32) 22 13 6 10

-50 0 50 100 200 150

Adit

Shaft

Trench

Old track

RIVULET

DUNDAS

TRANSMITTING LOOP

NOTES :

X Component

Survey by : Crone Geophysics
Date : Feb., 1985

5 cm

85-2457

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV					Bannockburn
SUNNY CORNER – PEM SURVEY X COMPONENT Channel 1					011
Map Ref. ANG	K-55-5	Latitude	39°55'S	Longitude	145°25'E
Surveyed	P.J., G.K.	Date	1984	Scale	1:2500
Drawn	T.G.D.S.	Date	July 1985	Drawing Nº	

Ref: AM/MG85/09 450-A5-13 FIG. 13

115457

145° 23'E

39° 55'S

58 000 N

57 900 N

57 800 N

65 300 E

65 400E

65 500 E

65 600 E

Adit

Shaft

Trench

Old track

RIVULET

DUNDAS

TRANSMITTING LOOP

NOTES :

Y Component

Survey by : Crone Geophysics
Date : Feb., 1985

5 cm

AMOCO

Amoco Minerals Australia Company

85-245

Project	GORDON RIVER			Nº A-80-82		
Project Partner				CSR		
Dundas JV				Bannockburn		
SUNNY CORNER - PEM SURVEY Y COMPONENT Channel 1				012		
Map Ref. ANG	K-55-5	Latitude	39° 55'S	Longitude	145° 25'E	
Surveyed	P.J., G.K.	Date	1984	Scale	1:2500	
Drawn	T.G.D.S.	Date	July 1985	Drawing Nº		

Ref: AM/MG85/09 450-A5-14 FIG. 14

115458

145°23' E

39°55' S

58 000 N

57 900 N

57 800 N

65 300 E

65 400 E

65 500 E

65 600 E

309 321 302 333 347 313 267 252 226 198 152 127

328 362 397 405 415 425 409 377 356 291 218 196

285 289 298 322 340 360 380 374 337 308 262 219

230 252 281 285 298 276 265 229 201 173

136 212 232 310 (310) 285 377 410 428 (428) 388 366 381 374 (374) 328 309 269 261 (261)

400

300

200

Adit

Shaft

Trench

Old track

RIVULET

DUNDAS

TRANSMITTING LOOP

NOTES :

Z Component (up)

Survey by : Crone Geophysics
Date : Feb., 1985

5 cm

85-2457

115459

AMOCO

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV					Bannockburn
SUNNY CORNER - PEM SURVEY Z COMPONENT Channel 1					013
Map Ref. ANG	K-55-5	Latitude	39°55'S	Longitude	145°25'E
Surveyed	P.J., G.K.	Date	1984	Scale	1:2500
Drawn	T.G.D.S.	Date	July 1985	Drawing Nº	

Ref: AM/MG85/09 450-A5-15 FIG. 15

014

within EL 15/76
Amoco/CSR Joint Venture

65300 E 65400 E 65500 E 65600 E 65700 E 65800 E 65900 E 66000 E 66100 E 66200 E 66300 E 66400 E 66500 E 66600 E 66700 E

Ties to Mariposa
58600 N

Mariposa Creek

Watercourse

Old track

Swampy

58400 N

Sink hole

39°55'S

58200 N

Track

5358000 N

RIVULET

58000 N

Adit
Shaft
Trench

57800 N

Old track

abandoned

Tramway

57600 N

DUNDAS

Sink hole

Swampy

57400 N

Old track

Water race

Watercourse

57200 N

5357000 mN AMG

Bannockburn workings
Dump

57000 N

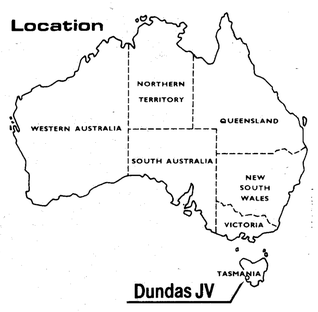
56800 N

181° T

56600 N

65300 E 65400 E 65500 E 145°23'E 366000 E 65600 E 65700 E 65800 E 65900 E 66000 E 66100 E 66200 E 66300 E 66400 E 66500 E 367000 E 66600 E 66700 E

Location



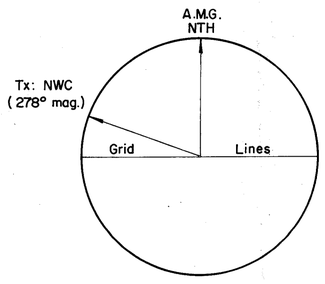
TN 11° MN

5 cm

1:2500

0 100 200 meters

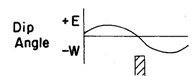
Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist



NOTES

Survey by : Amoco
Date : July, 1984
Receiver : Phoenix VLF-2
Tx : NWC
Vertical Scale : 1cm = 10°

Plotting Convention



Ref: AM/MG85/09

115400

85-2457

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV				Bannockburn	
VLF DIP ANGLES (NWC) 014					
Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E
Surveyed	P.J., G.K.	Date	1984	Scale	1:2500
Drawn	Mitre Geophysics	Date	June 1985	Drawing Nº	
Report					

450-A5.20a

Figure 20a.

017

within EL 15/76
Amoco/CSR Joint Venture

65300 E 65400 E 65500 E 65600 E 65700 E 65800 E 65900 E 66000 E 66100 E 66200 E 66300 E 66400 E 66500 E 66600 E 66700 E

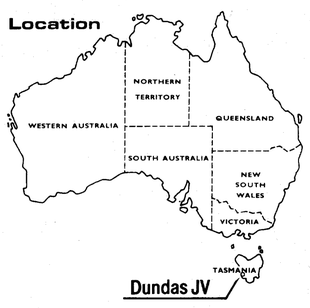
Ties to Mariposa
58600 N
58400 N
58200 N
58000 N
57800 N
57600 N
57400 N
57200 N
57000 N
56800 N
56600 N

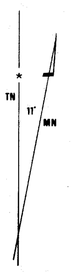
39°55'S
5358000 N
5357000 mN AMG
145°23'E

Mariposa Creek
Watercourse
Old track
Swampy
Sink hole
Track
RIVULET
Adit
Shaft
Trench
abandoned Tramway
DUNDAS
Old track
Sink hole
Swampy
Old track
Water race
Watercourse
Bannockburn workings
Dump
181° T

366000 E 367000 E

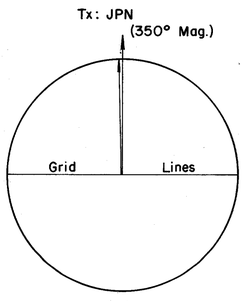
Location





1:2500
0 100 200 meters

Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist



NOTES

Survey by : Amoco
Date : July, 1984
Receiver : Phoenix VLF-2
Tx : JPN
Vertical Scale : 1cm = 10°

Plotting Convention
Dip Angle +E -W

Ref: AM/MG85/09

115461
95-2457

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV				Bannockburn	
VLF DIP ANGLES (JPN)				017	
Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E
Surveyed	P.J., G.K.	Date	1984	Scale	1:2500
Drawn Mitre Geophysics		Date	June 1985	Drawing Nº	

Report

450-A5-206

Figure 20b

018

within EL 15/76
Amoco/CSR Joint Venture

65300 E | 65400 E | 65500 E | 65600 E | 65700 E | 65800 E | 65900 E | 66000 E | 66100 E | 66200 E | 66300 E | 66400 E | 66500 E | 66600 E | 66700 E

39°55'S

5358000 N

5357000 mN AMG

145°23'E

366000 E | 367000 E

58600 N | 58400 N | 58200 N | 58000 N | 57800 N | 57600 N | 57400 N | 57200 N | 57000 N | 56800 N | 56600 N

Ties to Mariposa

Mariposa Creek

Watercourse

Old track

Swampy

Sink hole

Track

RIVULET

abandoned Tramway

Adit

Shaft

Trench

NDASS

Old track

Sink hole

Swampy

Old track

Water race

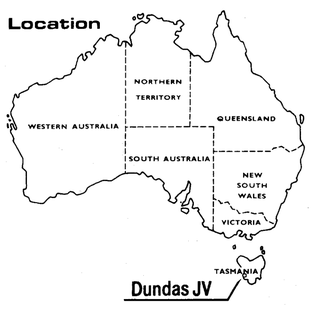
Watercourse

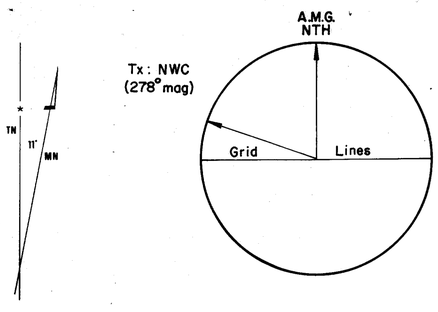
Bannockburn workings

Dump

18° T

Location





1:2500

0 100 200 meters

Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist

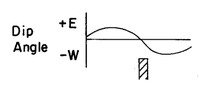
5 cm

NOTES

Survey by : Amoco
Date : July, 1984
Receiver : Phoenix VLF-2
Tx : NWC

Contours : 2, 5, 10, 15

Plotting Convention



Filter Algorithm

$$(Filt)_n = \tfrac{2}{3}\theta_{n-2} + \tfrac{4}{3}\theta_{n-1} - \tfrac{4}{3}\theta_{n+1} - \tfrac{2}{3}\theta_{n+2}$$

Ref : AM/MG85/09

115462
85-2457

Amoco Minerals Australia Company

Project	GORDON RIVER				Nº A-80-82	
Project Partner					CSR	
Dundas JV					Bannockburn	
VLF FILTERED CONTOURS (NWC) 018						
Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E	
Surveyed	P.J., G.K.	Date	1984	Scale	1:2500	
Drawn	Mitre Geophysics	Date	June, 1985	Drawing Nº		

Report

450-A5-2a

Figure 21a.

019

within EL 15/76
Amoco/CSR Joint Venture

Ties to Mariposa
58600 N

Mariposa Creek

Watercourse

Old track

Swampy

58400 N

Sink hole

39°55'S

58200 N

Track

5358000 N

58000 N

Adit
Shaft
Trench

abandoned

57800 N

Old track

Tramway

57600 N

Sink hole

Swampy

57400 N

Old track

Water race

57200 N

Watercourse

5357000 mN AMG

Bannockburn workings

Dump

57000 N

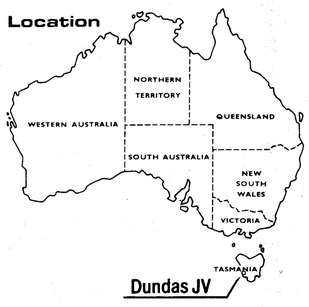
56800 N

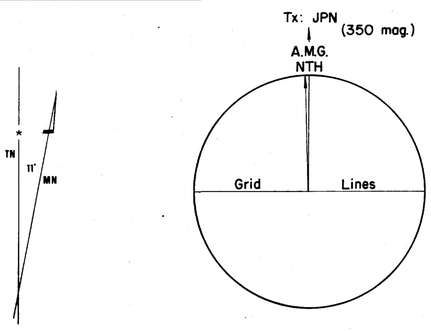
181° T

56600 N

65300 E | 65400 E | 65500 E | 145°23'E | 366000 E | 65600 E | 65700 E | 65800 E | 65900 E | 66000 E | 66100 E | 66200 E | 66300 E | 66400 E | 66500 E | 367000 E | 66600 E | 66700 E

Location





1:2500

0 100 200 meters

Basemap compiled from field mapping and airphoto enlargement
Discrepancies exist

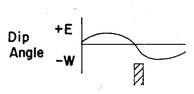
5 cm

NOTES

Survey by : Amoco
Date : July, 1984
Receiver : Phoenix VLF-2
Tx : JPN

Contours : 2°, 5°, 10°, 15°

Plotting Convention



Filter Algorithm

$$(Filt)_n = \tfrac{2}{3}\theta_{n-2} + \tfrac{4}{3}\theta_{n-1} - \tfrac{4}{3}\theta_{n+1} - \tfrac{2}{3}\theta_{n+2}$$

Ref: AM/MG85/09

115403

85-2457

Amoco Minerals Australia Company

Project	GORDON RIVER			Nº	A-80-82
Project Partner					CSR
Dundas JV				Bannockburn	
VLF FILTERED CONTOURS (JPN) 019					
Map Ref. ANG	K-55-5	Latitude	39° 55' S	Longitude	145° 25' E
Surveyed	P.J., G.K.	Date	1984	Scale	1:2500
Drawn	Mitre Geophysics	Date	June, 1985	Drawing Nº	

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450-45-26

Figure 21b.